THE BRICKBVILDER
AN ARCHITECTVRAL MONTHLY

VOLVME XXII APRIL 1913 NVMBER 4

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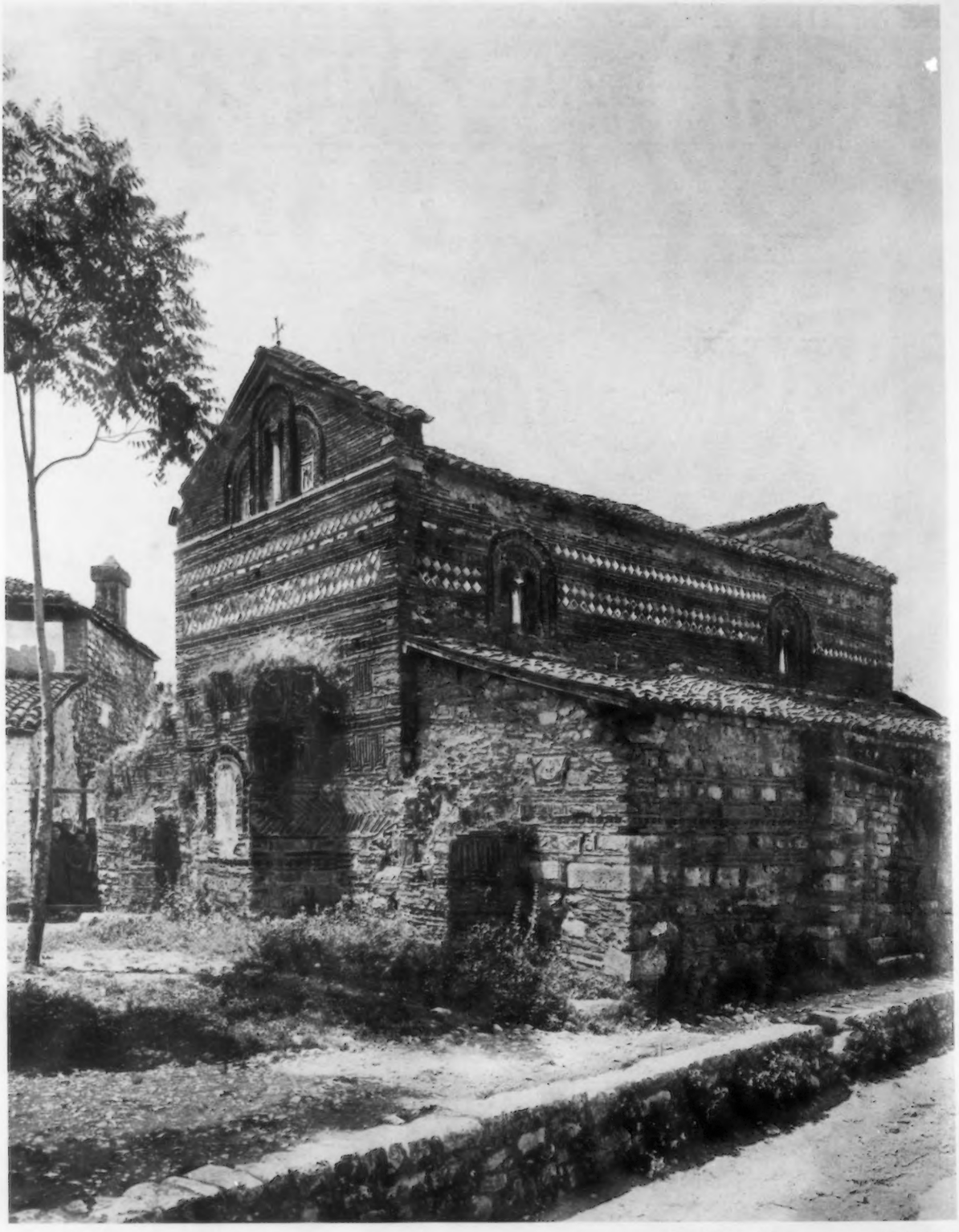


CHURCH OF HAGIOS VASILIOS, ARTA, EPIRUS, GREECE.

Photo by Royal Prussian Photometric Institute.

One of the richest examples of patterning, built in the early fourteenth century. Friezes of polychrome faience and cut brick.

THE BRICKBVILDER

APRIL, 1913

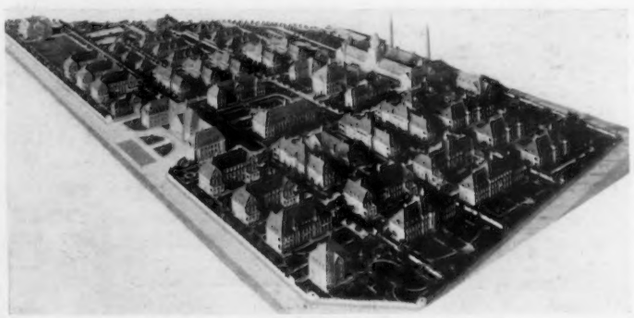
VOLVME XXII. NVMBER 4.

A Comparison Between German and American Hospital Construction.

BY DR. JOHN N. E. BROWN,
Superintendent of Detroit General Hospital, and Secretary, American Hospital Association.

IN Germany a general hospital is properly so called. All sorts of patients are received, — acute mental cases, tuberculosis, and the ordinary contagious diseases; provision is also made for epidemics of cholera and plague. This permits medical students, resident medical officers, and nurses to procure an all-around training. We know of no such hospital in this country.

The hospitals of Germany are constructed by the state or municipality. The amount of money needed is asked for and can be counted on. In America we are mainly dependent as yet on the voluntary system of support; though a few of our large cities are undertaking the building of hospitals as a proper part of civic work, making appropriations in their annual budget for this public service, just as they do for their water works, street cleaning, etc. In America, hospitals start in a small way and are enlarged, so that some of our older and larger institutions present a conglomeration of buildings such as are never found in Germany. The German hospitals are planned by the municipality or state architect, an official of much dignity. The office is the goal after a long and rigorous experience and thorough technical training. This official also plans the city hall, the court house, the schools, and other publicly owned buildings.



MODEL FOR GERMAN HOSPITAL GROUP.
Usual Custom Among German Architects.

Before beginning to build a German hospital, careful inquiry is made by the authorities as to what number of patients they will provide for; what amount of room will be required for males and females respectively; what space will be given over to medical, surgical, and other sorts of cases; what space for kitchen, how much for laundry and other services. A study is made of institutions already built, and statistics relating to all services carefully investigated. The building must conform to certain governmental regulations, such as the space allowed for day rooms for convalescent patients, the construction of stairways, etc.

Architects and medical men in Germany have not the freedom they have in America to carry out novel ideas. A close observer will find fewer mistakes and fewer oversights than he discovers in this country. This may be explained by the fact that the Germans follow precedent more, and the architect and director have had advantages both in the matter of special training and extensive observation in this particular field of practise which few American architects seem to have enjoyed. It is more customary in Germany than in America for architects to construct a model of the hospital they propose to erect. The advantages of doing this are many; we can strongly commend this custom.

German hospitals are built on extensive grounds, those of the pavilion type covering sometimes eighty or ninety acres. These grounds are beautifully parked; trees and gardens surround the pavilions. There is a fine sense of space all about. The air is clean and fresh, and sunshine floods the whole place. The buildings are remote from the dust and din of traffic. Convalescent patients are seen on the lawns, sunning themselves or resting beneath the shade of the low trees. Throughout the largest hospital sites run driveways or walks which divide the grounds into rectangular blocks. On each of these blocks stand groups which correspond to a general classification of patients. One does not find as many balconies (or balcony space) or roof gardens as in America. The patients are taken out on the lawns.

The ward buildings are not high, chiefly one and two stories. The architectural effect, both of the groups and of the individual building, in this natural setting, gives a sense of pleasure to the visitor, and must be attractive to the patients.

In many instances the visitor arrives first at a lodge, — a picturesque little structure, the residence of the *Pfortner*, or at his office off the main carriage entrance, which runs

SCHŒNEBERG.
Typical ward building, showing day rooms and balconies for out-door treatment and doorway for wheeling patients to grounds.

RIXDORF.
Pfortner's lodge, showing entrance to hospital grounds (at right).

through the administration building. This official receives him, learns his business, and directs him what to do and where to go. Frequently the *Pfortner* is detailed to accompany the visitor throughout the institution.

The newer hospitals are of the most thorough masonry construction. The general finish of the exterior is cement on common brickwork, applied in many simple and charming forms. Much well designed brickwork is also seen. The roofs of red tile tone pleasantly with the green foliage.

Ward floors are generally of tile or terrazzo. There has been some effort to obtain a more comfortable floor through the use of battleship linoleum. As in America, the use of linoleum and of plastic monolithic flooring seems to be still in the experimental stage.

Windows are usually of the casement type, some having transoms at the top. One type has a double transom which upon being operated opens the outer sash at the bottom and the inner one at the top. There is now coming into favor in England and America a type of window with several cross sashes pivoted at the bottom similar to a transom. Either style of window gives practically one hundred per cent natural window ventilation. The latter type has the advantage of directing the air currents upward; the former are more quickly and more easily manipulated. The German windows generally extend close to the ceiling, and the sills are low enough to give the patients a view out of doors. We seldom see casement windows in the hospitals of this country.

DUSSELDORF.
Entrance to grounds through Administration Building, showing Pfortner's office.

The accessory rooms of the ward are grouped separately at opposite ends of the ward. This arrangement, we consider, makes for the convenience of the nurses. In America we seek to give two sides and one end of the ward to the air and sun.

The Germans make fine provision for natural treatment of

VIRCHOW.
One-story pavilion.

RIXDORF.
Administration Building from center court.

patients on the medical side by providing, in their bathhouse, baths of all sorts, — mud, sand, carbonic acid, steam, electric, hot and cold water, in various forms. The private sanitariums provide special baths, such as sun baths and open-air baths. This bathhouse of the hospital is generally placed near the medical group of pavilions, and is related to this group much as the operation house is related to the surgical group.

RIXDORF.
Bathhouse and two-story ward from center court.

It is common in Germany to see mechanico-therapy rooms — Zander rooms. These are very rarely found in America. The various apparatus in this department are most valuable in the treatment of deformities, contractures, and similar afflictions.

The operation house contains all the operation rooms with their annexes. These subsidiary rooms are fewer in number than one sees in some of the newer American hospitals. The surgeons' washup bowls are often found in the operation room proper. There does not seem to be the same accommodation for operating room nurses as is provided on this side of the water. Nurses there, however, are apparently not so numerous in attendance at operations as they are with us. Provision for sterilization is most complete, and in the room provided for this purpose you will often see apparatus for distilling water and supplying salt solution.

At the St. Georg Hospital, Hamburg, the air is filtered through gravel and sand before being forced, on the plenum plan, into the operating room. Following each operation the room is disinfected by steam. We have not noted such complete precautions anywhere in the United States.

In this country we are beginning to manufacture for our operating plants copious supplies of sterile water for surgeons' and nurses' washup; for example, the Gary Hospital, Gary, Ind.; St. Luke's, Presbyterian, and the Augustana Hospitals, Chicago; the German, Philadelphia; the German Deaconess Hospital at Buffalo, and the Harper Hospital, at Detroit.

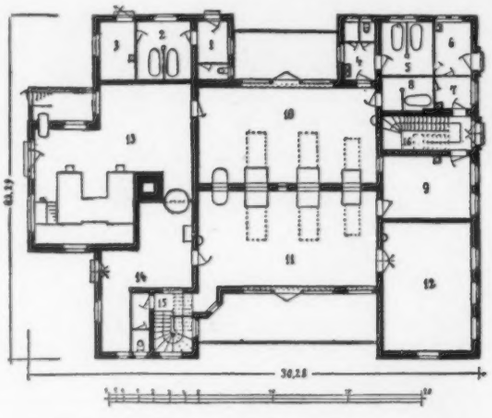
The Germans seem to agree with our latest conclusions in regard to simplicity in the matter of ventilation and heating. We have not heard of such failures of mechanical ventilation in German hospitals as we have in some of the leading hospitals in America where the plenum system seems to have proved a failure. The only place in which we saw this system working efficiently was at the Victoria Hospital, Belfast, Ireland; even there in the nurses' residence it was discarded. When on duty, nurses, like patients, submit to it, — an even temperature of about sixty-six degrees with all windows and doors tightly closed.

The Virchow Hospital, in Berlin, is ventilated in the following manner:

In the underground floor of each of the pavilions are placed one or more ventilating fans, according to the requirements. These draw in fresh air from little vertical air houses standing amid the shrubbery a few yards from the pavilions. The air passes through a chamber for straining out the dust, a cotton wool filter being used. The air is then driven into a steam-heated chamber, and

COLOGNE — HOSPITAL AUF DER LINDENBURG.
Wards and corridors along central court. Note parking.

from here through distributing channels, and hence through wall channels into the different rooms. As the local climate is sufficiently humid, the air is not moistened, as is done in some places. The foul air is withdrawn from each room by sufficient outlet channels, which extend to the roof story and terminate in a chamber in front of an exhaust fan. It is sucked from here and driven through ridge turrets into the open. In addition to this mechanical system, provision is made for natural ventilation through trap windows. The ventilating apparatus of the lavatories, kitchens, and sink-rooms is made particularly effective in order to quickly carry off the vapors and mal-odors which form there.



PLAN OF TYPICAL DISINFECTION HOUSE.

Germans have their heating and power plant placed in a service building, which building usually contains the kitchen, laundry, and employees' dormitories. The medium of heating is by means of steam or hot water. The pipes may terminate in radiators located along the center line of the room or along the walls. In the wards of the Virchow there are two four-inch hot water pipes running the whole length of the ward. These can be more easily cleaned than the ordinary radiators, and can be inspected very readily. A sensible type of radiator is the one now being put in the new measles building of the Willard Parker Hospital, New York City, there being room between the sections to allow for easy cleaning.

German laundries and kitchens are spacious. One seldom finds hoods over ranges and mangles. The black, dirty-looking stockpots of the American hospital kitchen are nowhere in evidence in Germany. Stockpots are covered with nickel, enamel, or white metal, and set on a neat, round, central foot. Some of the pots are provided with a water jacket as well as with a steam jacket, which permits their being used for a variety of purposes. Both kitchens and laundries are divided into separate rooms for the separate duties; sometimes these subsidiary rooms are merely alcoved off. In America we more often find nearly everything done, both in laundry and kitchen, in one large room.

STERILIZATION APPARATUS IN WALL.

The Germans provide in their hospitals more laboratory accommodation than we do. This is especially true of their teaching hospitals. In one of the medical or surgical units of the Charity Hospital, Berlin, for instance, you will find commodious laboratories adjoining the ward unit,— for bacteriology, for chemical pathology, for surgical pathology, for X-ray work, etc., and other special rooms for original research. Our laboratories are remote from our wards, which probably corresponds to the scientific status of our medical organization. Our clinicians are not pathologists; many of theirs have arrived at the kingdom of clinical medicine after a prolonged period in the realm of pathology, hence can combine the work of the two in one in a great measure.

Disinfection receives much more attention in Germany than in America. Disinfection houses are seen in connection with all large German institutions. In America the writer has not seen any. In a typical German disinfection-house, belonging to a large hospital, you will see provision made for disinfecting various types of material in various sized sterilizers. These sterilizers are set through a wall — the soiled or infected material being brought to the room on the "unclean side," placed in the sterilizers, and withdrawn in a room on the clean side. Off this clean room may be found the store room for the disinfected clothing. Provision is also made for the disinfection of doctors, nurses, patients, and employees. There is a room for the removal of infected clothing; adjoining this is the bath room, and beyond a clean room in which fresh clothing is put on.

Besides the complete disinfection plant in the disinfection building there is, in many hospitals, provision made in the ward unit for the disinfection of ward linen. A vessel is placed in a wall between two rooms, one half of it projects into the room for the reception of the soiled linen, the other into a small room on the other side of the wall — the clean side. After the linen is first thoroughly soaked and the blood and pus stains removed, it is disinfected by means of heat carefully applied, plus, in some instances, the use of an antiseptic solution.

Sewage from wards is piped to a cement cave-house — the *siel grubenhaus* — and here disinfected before being allowed to run off into the general sewage system of the city. This feature is absent in America, but should be introduced. Many hospitals here allow their typhoid stools to pass into the general sewage system, not disinfected, or only partially disinfected. And many cities secure their drinking water from the lake into which this sewage is poured!

Basements are used in German hospitals for the protection and carrying of piping required for the heating, ventilation, and other apparatus, and for storage. In America, too often, basements are used for laundry, kitchen service, or even as dormitories.

For the illustrations accompanying this article the writer is indebted to Mr. W. B. Stratton, architect of the Detroit General Hospital.

The Planning of a Young Men's Christian Association Building. — Part II.

BY LOUIS ALLEN ABRAMSON.

THE Young Men's Christian Association as a power in a community reaches out beyond the zone of social and physical enterprise. It extends its co-operation in still another direction; namely, educationally, both academic and industrial, as its constituency demands. And so for a two-fold purpose. Firstly, for the benefits to be shared by the students, and secondly, by reason of the fact that the educational department forms a prolific channel through which to procreate recruits to the other branches of association endeavor.

Albeit the existence of public evening schools where the opportunity of free tuition is offered, the association has invariably successfully and profitably carried on its own educational work on a fairly extensive scale. This it has been able to accomplish by making the instruction individual, thus necessitating smaller class-units than would ordinarily be provided for school purposes.

FIG. I.
Class Room for Laboratory Work.

The class rooms, preferably located on the story immediately above the social rooms, should be located farthest from the gymnasium, running track, bowling alleys, and other sources of disturbance. If the building is situated on a thoroughfare, not subjected to the noise of heavy traffic, the class rooms should be placed along the front of the building; firstly, to take advantage of the permanent light, and secondly, so that by night their illumination will convey an impression of activeness.

Two types of class rooms should be provided: for those requiring special and permanent furniture, as for the study of typewriting, drafting, or laboratory work (Fig. I); and for those containing movable equipment, such as can be used for the study of language or stenography. The former type of class rooms should be enclosed with rigid noise-resisting partitions and used exclusively for its assigned purpose. Whereas the latter should be arranged in series, so that by operating movable partitions two or more of the rooms can be thrown together to accommodate a class or conference that would otherwise overtax the capacity of one (Figs. II and III). This arrangement makes possible the use of the entire group as a place for general assembly or banquets. The class rooms should never exceed a width of 24 feet; and if they are to be adapted for use as a banquet room, 18 feet should be the minimum width. It is advisable to vary the other dimensions of the rooms from between 12 and 18 feet to provide accommodations for classes of varied attendance. Manual training or other classes for mechanical trades which are sources of disturbance to other work should best be placed elsewhere. Toilets for both sexes should be provided on this floor. Access to them should be had directly from the corridor.

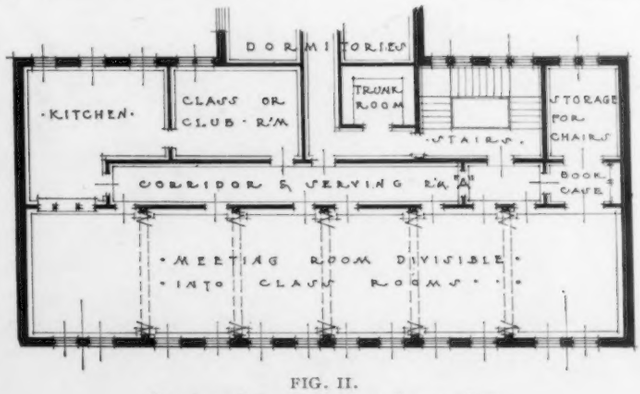


FIG. II.
Showing relation of Kitchen to Banquet Room.

The Association is assisted in certain work by a Ladies' Auxiliary and for it an ample size meeting room with generous storage space should be provided. The position of this room should be preferably between the kitchen and ladies' toilet. However, its use will not be confined to the above-mentioned purpose; and nothing should be included that would prohibit its use as a class or club room or meeting place for social purposes.

Storeroom. At such times as the class rooms are in use for banquet purposes the class-room furniture (student chairs, desks) should be removed to a conveniently located storeroom, which will at other times contain such furnishings (chairs, horses, etc.) as are used for banquets.

Kitchen. The size and magnitude of the equipment of the kitchen depends entirely upon local requirements. In many Associations the kitchen is used principally as a serving room and where light refreshments can be prepared. If the banquet room is subject to rental for other than association purposes, then the usual kitchen complement, including coffee urns, steam tables, etc., must be installed.

The service from the kitchen to banquet room need not necessarily be direct. As the objective of the Association banquet is primarily the conference which follows, the dishes must be served and removed rapidly and with facility. An arrangement similar to that shown in Fig. II is desirable. Obviously the corridor ordinarily used as a means of access to the class rooms is unnecessary and a single entrance to the banquet hall is sufficient. By closing the door at "A" the

corridor is converted into a serving room permitting rapid service through each class room door from the serving tables arranged in the corridor.

Dormitories.

Manifestly, the number of dormitories to be provided must be determined by a convass of the local demands. It is well to remember, however, that in no community, to the author's knowledge, have dormitories been provided in excess of the need. Further, investigation has shown that seldom has it been necessary for an Association to convert dormitories into other rooms by reason of lack of occupancy.

The arrangement of the dormitory plan itself should be given careful study and considered from many angles. As the dormitory rooms are more generally in use at night, while desirable, still the question of daylight, except to give the room a wholesome atmosphere, is not potent. But good natural ventilation is absolutely essential, as it is only in the very large Association buildings that a system of forced ventilation or even indirect heating can be maintained.

Stairways and other means of egress should be liberally

FIG. III.
Meeting room divisible into class rooms.

provided and cautiously distributed. Where dormitories occupy more than one story, and on one or more of which are other departments, a separate stair connecting the dormitory sections should be provided to make possible the circulation of men in negligée attire. Avoid an arrangement of corridors and rooms that compels the men attending classes or meetings to pass through a dormitory corridor to reach their destination.

Dormitory Room. The dimensions of the dormitory rooms vary with the types of men for whose occupancy they are provided. In a highly residential or educational community, where members acustomed to and who can afford to pay for convenience and luxury are to occupy the rooms, obviously they should be relatively large; perhaps 10 feet wide. In a manufacturing community the dormitories should be of the minimum size, between 7 feet and 8 feet 6 inches wide, so that a minimum rental can be assessed, which will place the rooms within the possibilities of the men whom the Association is most anxious to serve. When both extremes in membership must be accommodated, no definite barrier must be established between the two classes. Segregation is not desirable or wise. The depth of the room should never be less than 12 feet; it is wasteful if in excess of 15 feet.

The built-in closet has been universally adopted on account of its superiority over the movable wardrobe. It is dust-proof and more tidy, and by reason of its larger dimensions can accommodate the suit cases, boxes, etc., which are usually the possession of the room's occupant.

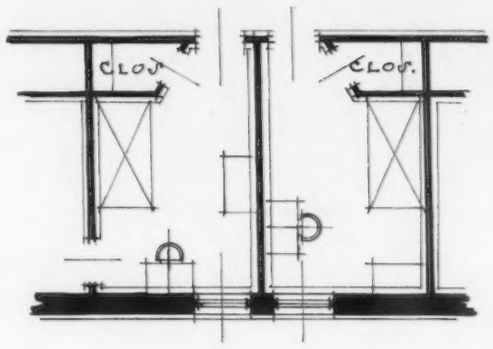


FIG. V.
A model dormitory.

It is a fallacy and indicative of a poor plan to be compelled to place closets between rooms (Fig. VI). From an economic viewpoint it is obviously wasteful, inasmuch as the periphery is of the greatest value and this arrangement decreases the possible number of rooms facing on exterior walls. Fig. V represents the model dormitory. This arrangement is by far the better, allowing a maximum number of rooms. The width of the closet should be sufficient so that the head of the bed can be placed against it. The splayed face imparts the impression of a greatly larger room than if the closet were built right-angular. The door should be hinged so that when swung open the window light will be admitted. The room door itself is placed directly opposite the window so that the circulation of air can be had without a draft over the cot. The door should be unglazed, but a transom must invariably be provided. A glazed transom is not desirable; preferably, one of wire mesh or louvres, both of which render the rooms less seclusive. Infractions of the rules can be easily detected and warning given of illness or accident. In Associations such as for army or

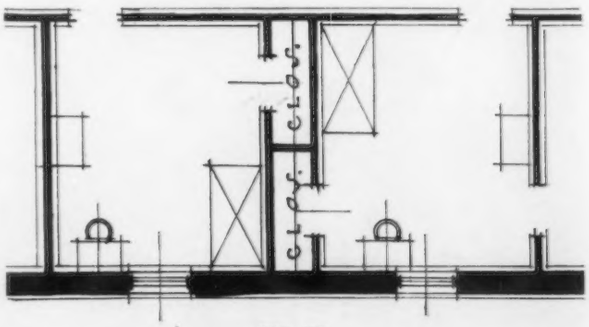
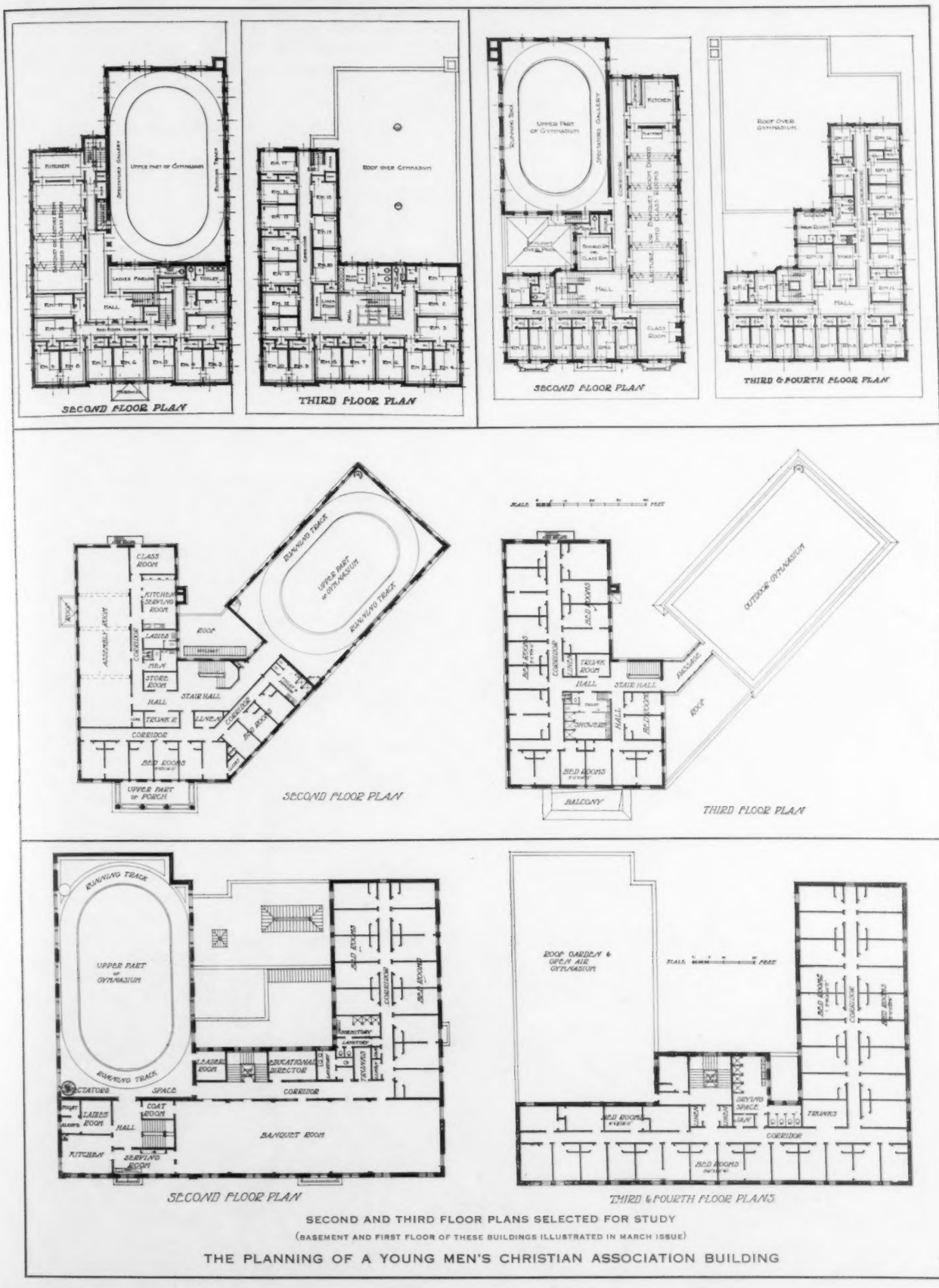


FIG. VI.
A wasteful use of dormitory space.

navy or industrial work, where the membership is such that gross violation of the rules is frequent, in addition to the open transoms the doors should be raised several inches from the floor. It has been the experience of the author that wash basins should not be provided within the dormitory rooms. Their use has been abused and the



SECOND AND THIRD FLOOR PLANS SELECTED FOR STUDY

(BASEMENT AND FIRST FLOOR OF THESE BUILDINGS ILLUSTRATED IN MARCH ISSUE)

THE PLANNING OF A YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING

existence of vermin has been attributed to this indifferent usage.

Perhaps twenty-five per cent of the dormitories should be intercommunicating, preferably the corner rooms. In locating the connecting doors, care should be taken that sufficient wall space is retained that the necessary furniture can be accommodated.

General Lavatories. The position of the general lavatory obviously should be central to the rooms, preferably at the intersection of corridors. If the plan is such that direct sunlight could only be had at one point, there the general lavatory should be found, so imperative is it that this room be fresh with sunshine to vitalize the atmosphere and destroy virulent organism. However, during certain seasons it is both impractical and impossible to open windows, and it is therefore necessary to here introduce a system of indirect or forced ventilation. The simplest method is to install a ventilator and fan immediately over the showers, depending upon the rising steam to induce a circulation.

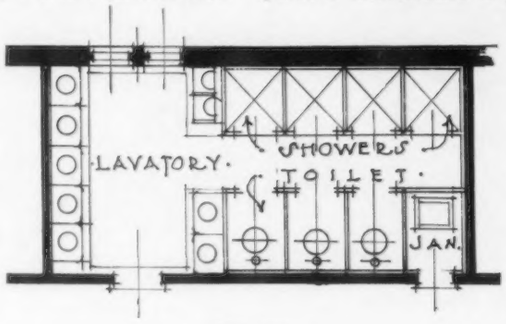


FIG. VII.
Usual Arrangement for General Lavatories.

Fig. VII indicates the usual arrangement. Fig. VIII represents the proper plan.

The number of fixtures to be provided can be safely assumed in the following proportions :

1 shower	For	8 men
1 water-closet	,,	12 ,,
1 wash basin	,,	6 ,,
1 urinal	,,	12 ,,

The shower room must be so situated that it will be unnecessary to pass through it in reaching the toilet or lavatory, otherwise water would be draggled through the corridors. Similarly, the toilet should not be in close proximity to the lavatory, as otherwise it would constitute a nuisance. The lavatory itself must be of generous size, with the basins placed directly in front of the source of light. Numerous mirrors should be arranged around the walls and not above the basins. This precaution should be taken, as otherwise men while shaving would prevent others from using the basins.

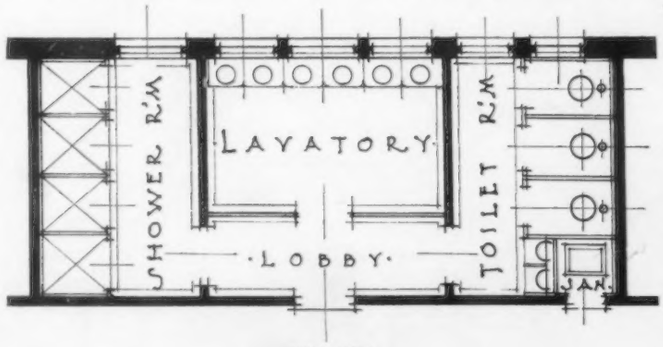


FIG. VIII.
Proper Plan for General Lavatories.

The general lavatory is taxed to capacity at times, and circulating space should not be cramped in either the lavatory or shower room. Men will stand around rubbing down after a bath, and when shaving require elbow room. In the former case, the individual after drying should not be rubbing shoulders with others just emerging from a shower. While in the latter, freedom from possible interference is essential.

Janitor's Closet. As it is possible that at some period female help be employed, the janitor's closet should not be entered from the lavatory. Provision must be made for a toilet and slop sink and for the accommodation of the usual janitor's appurtenances.

Trunk Room. The trunk room should be placed immediately opposite the stairs or the lift, if provided. Entrance should be through a wide door opening, and sufficient wall space should be provided to accommodate at least one trunk for each dormitory. It is obvious that ventilation for this room is extremely desirable. At least several registers should be installed in partitions close to floor and ceiling.

Linen Closet. A linen closet lined with cedar must be provided on each dormitory floor, in which will be kept the clean dormitory laundry supplies. The shelves should be of sufficient depth and width to comfortably store the largest pieces, as the blankets, etc., and space must be provided for a laundry hamper.

Roofs.

When the acquisition of ground area for athletic or playground purposes is impractical, recourse should be had to the roofs, which can be utilized to good advantage by the construction of cinder tracks, tennis, hand and basket ball courts. Again, the roof over the gymnasium can be constructed so that it can be used as a roller skating rink in the summer and inundated for ice skating. Caution should be exercised not to provide any of the above expensive features to satisfy the passing fancy of an inconstant membership.

Editor's Note. — The first article in this series on the Planning of a Young Men's Christian Association Building was published in the March issue of The Brickbuilder. The series will be continued in the June issue, being omitted from the May number. The author has asked for additional time in which to collect important data. This break in the continuity of the articles is regretted but we feel will be justified by the added value of the third paper.

The Unit Power Plant for Isolated Buildings and Small Groups. — Part III.

DETAILS OF DESIGN.

BY CHARLES L. HUBBARD.

AFTER having determined the total power of boilers, engines, and generators, the next step is to decide upon the number of units to employ. In plants of any considerable size a spare boiler should always be provided, not only for use in case of accident, but as a relay when cleaning or inspecting. In small plants, where power is simply required for lighting during the evening, it may be sufficient to provide a pair of boilers having a combined capacity just equal to that required, and depend upon the non-lighting period, when one of the boilers will be out of service, for cleaning and repairs. It is safer, however, to provide a spare boiler and just as economical in the long run. A good arrangement is to provide three boilers, of such size that two will easily do the work, as this always gives a spare unit to fall back upon in case it is needed. When the maximum load is required for only a short time, and it is desired to keep both space and cost at the lowest point, a boiler capacity some thirty per cent below the normal may be installed, and if there is a good chimney draft, the plant may be easily forced up to the normal capacity without serious loss of efficiency. This, however, should not be done unless the period of forcing is short and the boilers of the best design.

FIG. I.

It is almost universal practice at the present time to connect both engine and dynamo to the same shaft, thus doing away with belts and economizing space. Such an outfit is called a *unit* or *generating set*. As the efficiencies of both engines and generators are greatest at full load, it is desirable to have several units so arranged that as the load increases their power may be added as required. While greater economy may be secured by using machines of different sizes and operating them at or near full load, there are certain practical considerations which must also be taken into account. A method which has given satisfaction in many cases is to divide the total capacity into three units, of such size that two of them, by being overloaded twenty-five per cent, will do the maximum work. The first cost in this arrangement is less, the machines are interchangeable in case it is desired to cut one out, and only one size of parts need be kept on hand for repairs.

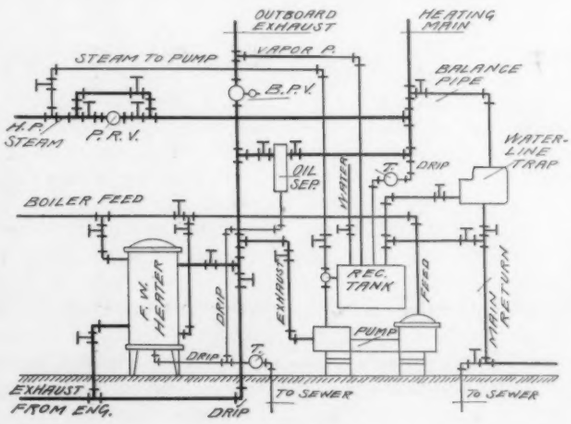


FIG. II.

The distribution of the load throughout the day has an important bearing upon this matter and should be carefully considered in each particular case.

General Arrangement. In electric power plants of large size the arrangements of the boilers and engines usually follow certain general schemes which experience has found to be desirable. When the plant is located in the basement of an office building, or forms part of the power and heating system of some public building or institution, these arrangements cannot be carried out to any extent on account of the location or limited amount of available space. This makes it necessary to work out the general scheme of each plant by itself, according to local conditions, taking care to make it as compact as possible, and so arranged as to simplify the handling of coal and ashes.

While the boiler and engine rooms should be adjacent, it is best to separate them by a heavy wall and tight closing door for keeping both dust and steam from the engine room. In general, all equipment having moving parts should be kept out of the boiler room on account of dust and grit. Exception is often made to this in case of the feed pump, which should be conveniently located with reference to the gauge glasses upon the boilers.

Foundations. These are usually constructed of concrete, both for boilers and engines. For tubular boilers, the foundations should extend from 8 to 12 inches on each side of the walls which they support. If a substantial footing is not available, a solid bed of concrete should be provided, of sufficient size to accommodate the entire setting. The depth will commonly run from 2 to 3 feet, according to the nature of the soil and size of boilers. Detail drawings of engine foundations are usually furnished by the builder. Care should be taken not only to make the foundations stable, but also to provide against vibration being transmitted to the building. This may be largely prevented by the construction shown in Fig. I, where the main foundation is surrounded by a wall of brick or concrete from 12 to 18 inches away, and the space between filled with closely packed sand. Sometimes, when the soil is firm, the wall is done away with and the sand simply placed in a trench around the foundation. The area and depth of foundation will depend largely upon the nature of the soil and weight of the machine, and must

be worked out for a live load according to local conditions.

Arrangement of Piping. When laying out a system of piping one should provide pipes of sufficient size to maintain boiler pressure; reasonable compactness to prevent excessive condensation; provision for expansion; freedom from pockets for the collection of water; and a system of drainage which shall keep the pipes free from condensation. While valves should not be provided too freely, on account of complicating the system and adding to the expense, they should be placed in such a manner that all important pieces of apparatus may be cut out for repairs, by-pass connections being provided for use at such times.

Another important matter is flexibility of the heavy piping, so that the movements due to expansion and contraction will be taken up without bringing heavy strains upon the pipe and fittings. This is usually accomplished by the use of offsets, sweep bends, and swivel joints.

Piping Material. "Wrought-iron" pipe, so called, is made *standard weight*, *extra strong*, and *double extra strong*. The standard weight is commonly used for all pressures up to 125 pounds per square inch, and tests show it to be amply strong for pressures considerably higher than this. Nearly all of what is commonly known as wrought-iron pipe is mild steel. There seems to be no special advantage in using wrought iron, unless for very large and heavy work, where it is desired to weld the flanges directly to the pipe. It is more expensive and is not generally kept in stock by the ordinary dealer. Cast-iron fittings, both screwed and flanged, are used for all classes of steam work. They are made in three weights, the lightest for low pressures, such as exhaust and condenser work; standard weight, for pressures up to 100 or 125 pounds per square inch; and extra heavy for higher pressures up to 250 pounds.

When pipes are to be joined permanently, couplings are used, but for all work around boilers, engines, pumps, and heaters, where it may be necessary to disconnect the piping occasionally, the joints should be made up with flanges or unions, according to the size. Pipe bends of large radius are largely used in making boiler and engine connections on account of their greater flexibility. Another important point is the method of making up the flanged joints in high-pressure work to prevent leakage.

A good type of joint for pressures around 100 to 125 pounds is made by screwing the flanges solidly to the pipe, facing off the projecting ends in a lathe, and packing the joint with a corrugated copper gasket. The type and quality of the valves is an important detail in connection with a system of piping. In general, gate valves are best for high-pressure work, and for the larger sizes, say 4-inch and above, the "outside screw" or "yoke" pattern is to be preferred, because it is not only easier to pack and oil, but also shows at a glance whether it is open or closed. For sizes 8-inch and above, the by-pass type should be employed, on account of greater ease in operation and less liability of scoring the seat when opening and closing. By first opening the small by-pass and equalizing the pressures on each side of the valve, these difficulties are avoided. The seats should be renewable, and either of bronze or of some special material adapted to high temperatures and pressures. Gate valves should not be placed with the stem in a vertical position with the wheel at the *bottom*, as they form an obstruction to the flow of condensation if not fully open. For the same reason globe valves should always be placed with the stem in a horizontal position when used in a horizontal pipe.

Expansion. Pipes fitted at a temperature of 60 degrees expand about 2¼ inches per 100 feet in length when filled with steam at 100 pounds pressure. For this reason great care must be taken to so arrange the piping that this increase will be taken up without producing strains. As previously stated, this may usually be done in engine and boiler rooms by the use of offsets and bends, but in straight runs of considerable length, as in conduit work, slip joints are commonly used.

Insulation. Steam pipes, separators, heaters, etc., should be covered with some good insulating material to reduce the amount of condensation, and also to prevent overheating the engine and boiler rooms.

The best makes of sectional covering should be used for high-pressure piping, and among these may be mentioned — "eighty-five per cent carbonate of magnesia," certain brands of "fire felt," and "cork" coverings. Certain grades of asbestos fiber also make an efficient material. Valves and fittings may be provided either with moulded or plastic covering, according to whether or not it is to be removable. Smoke connections, large heaters, tanks, etc., are commonly covered with block insulation, finished with a coat of plastic material.

Pipe Connections. The typical methods employed in connecting up the different pieces of apparatus are best shown by a series of diagrams. Fig. II illustrates in detail some of the pipe connections in a non-condensing plant where the exhaust steam is used for heating purposes. The exhaust main from the engines is carried beneath the floor and is so valved that the steam can be passed either outboard through a back-pressure valve, or into the heating system through an oil separator. A closed feed-water heater is connected with the main so that either a part or the whole of the exhaust can be made to flow through it. This arrangement allows the heater to be cut out, in case of repairs, and also makes it possible to pass all of the exhaust through it in the summer time when the heating system is not in use. A cross-connection is made with the high-pressure main for automatically supplying live steam to the heating system through a pressure-reducing valve in case the exhaust should prove insufficient at any time. The return from the heating system is trapped into a vented receiver and pumped back to the boilers automatically when the water line in the tank rises above a given point.

A typical boiler and engine room layout for a medium sized plant is shown in Fig. IV. The outfit consists of two water-tube boilers, two generating sets, duplicate feed pumps, receiver, and feed-water heater. This forms part of a combined power and heating plant, and therefore has connections with the heating main through an oil separator and pressure-reducing valve, as indicated.

Fig. III. — In this particular case the discharge water is turned into the sewer and therefore no oil separator is required. The connections are such that the feed-water heater may be by-passed and the exhaust turned directly outboard; also a relief valve is provided beyond the heater for the same purpose. When working regularly, all of the steam passes into the condensing cone where it is mixed with the cooling water and condensed.

The feed connections for a non-condensing plant are shown in Fig. V. The supply main branches into two lines, one leading to the receiving tank and the other to an injector near the front of the boilers. The discharge from the feed pump is passed through a closed heater on its way to the boilers. The arrangement for a condensing system is shown in Fig. VI, and is practically the same, except for the introduction of a second heater. In this case "B" takes steam from the main engines at condenser pressure, while "A" is supplied with exhaust from the pumps at a pressure of 1 or 2 pounds gauge.

Pipe Sizes. The pipe sizes in boiler and engine rooms are largely fixed by the outlets provided on the different pieces of apparatus.

A simple method which gives pipes of ample size for average conditions is to allow 0.12 square inches per indicated horse power for supply pipes to engines, and 0.18 square inches for exhaust. For underground heating mains of considerable length, the following table may be used, based on a drop in pressure of 1 pound in 1,000 feet of run :

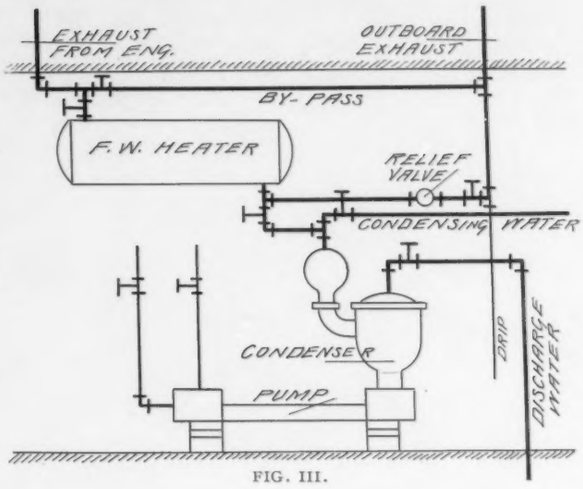


FIG. III.

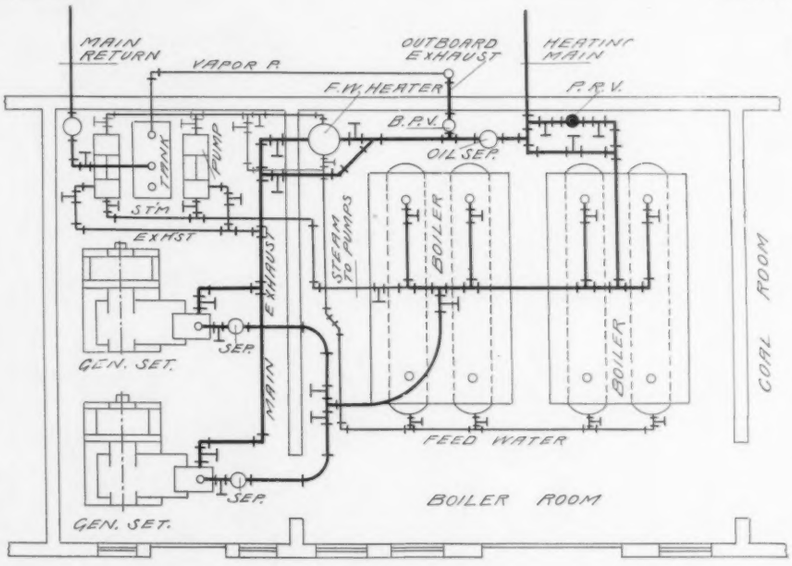


FIG. IV.

Pipe Conduits. In heating a group of buildings from a central plant, the distributing mains and conduits form an important part of the equipment.

In selecting the best type of conduit, it is necessary to consider the insulation, the initial cost, and durability.

The materials in most common use are wood, vitrified tile, and concrete, while brick is used to a considerable extent in the construction of manholes. While wooden conduits are the cheapest to construct, they are not so durable as either tile or concrete, hence the problem should be considered from all sides when deciding upon the material to be used for a permanent installation.

A common form of wooden conduit is shown in Fig. VII. Solid turned logs are used for pipe sizes up to 6 inches, and staves for larger sizes. The shell varies from 2 to 4 inches in thickness according to size. The life of a wooden conduit depends upon the quality of the timber, and the thoroughness of waterproofing and underdraining, the average being from fifteen to twenty-five years. The sections of tile are

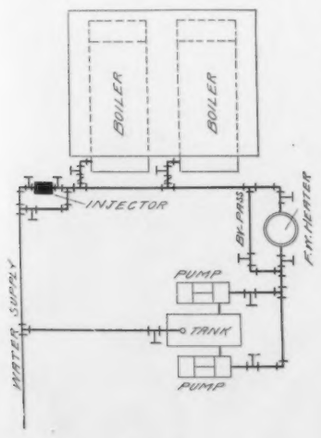


FIG. V.

TABLE IX.

Size of Pipe.		Square Feet of Direct Radiation Supplied.
Supply.	Return.	
2½"	2"	700
3"	2½"	1,000
3½"	2½"	1,600
4"	3"	2,300
5"	3"	4,000
6"	3½"	6,500
7"	3½"	10,000
8"	4"	14,000

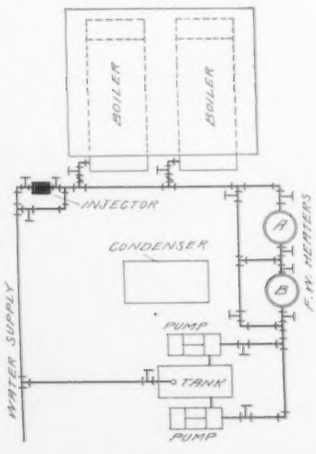


FIG. VI.

usually split lengthwise, the lower half being laid first, and after the steam pipes are run and tested, the upper half is put in place and the joints made water-tight with cement.

The pipe supports and anchors are placed in inverted tees and the lower part embedded in cement. Insulation is provided by filling the space around the pipes with specially prepared asbestos or other suitable material.

A concrete conduit is shown in Fig. VIII. By making the cover in sections and cementing the joints, it is more easily opened for pipe repairs than if made solid. When the distances are short and a number of pipes and electric cables are to be accommodated, a tunnel similar to that shown in Fig. X is much to be preferred, although considerably more expensive. This arrangement gives ample room for inspection and repairs without opening up the conduit. Fig. IX shows two methods of arranging the expansion joints and anchors. In the upper line, "A A" represent anchors, and "B" a combined anchor and double expansion joint. The direction of movement due to expansion is indicated by the arrows. In the second line, "C C" are anchors combined with single expansion joints. These special fittings consist of a heavy casting with a foot or standard which is anchor-bolted to a concrete pier embedded in the earth. This casting also forms the body of the expansion joint, which may be either single or double as desired. While slip joints are commonly used, they are liable to work loose, and if tightened up too much, to stick, thus causing the pipe to buckle when it expands.

This condition has been overcome by the use of specially designed devices where the movement is taken up by means of flexible copper diaphragms instead of sliding joints. The distance between the joints will depend upon the type used and the amount of movement they are designed to take up. In general, this should not exceed 5 or 6 inches, which will limit the distance to 200 or 300 feet under average conditions.

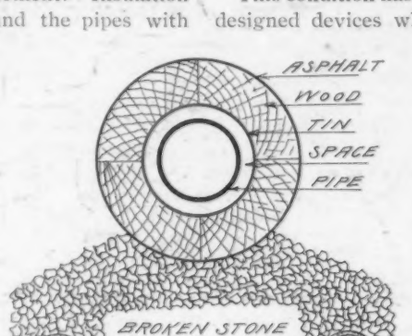


FIG. VII.

Cost of Construction. In work as important as the laying of underground mains the type of conduit should be selected and estimates obtained by contractors familiar with local conditions. For approximate work the following table may be used, which is based on the average cost of four different kinds of conduits, and includes excavating and filling (exclusive of rock excavation), conduit, supply and return piping, and insulation:

TABLE X.

Size of Supply Main.	Cost Per Foot.
3"	$1.70
4"	2.00
5"	3.00
6"	3.40
8"	4.50

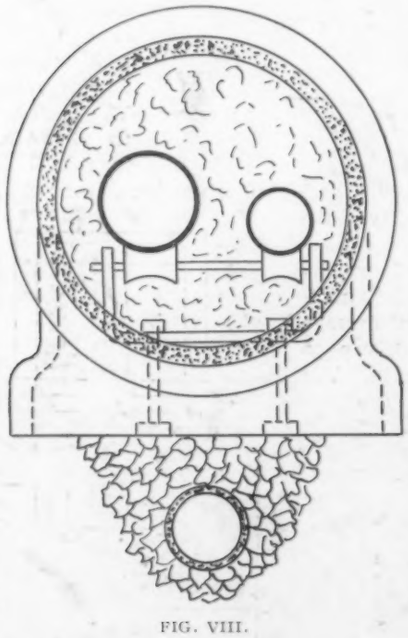


FIG. VIII.

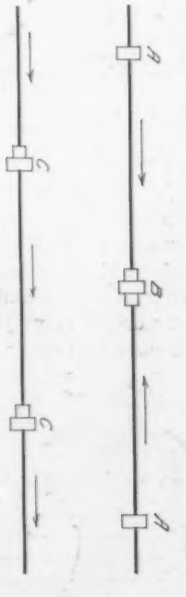


FIG. IX.

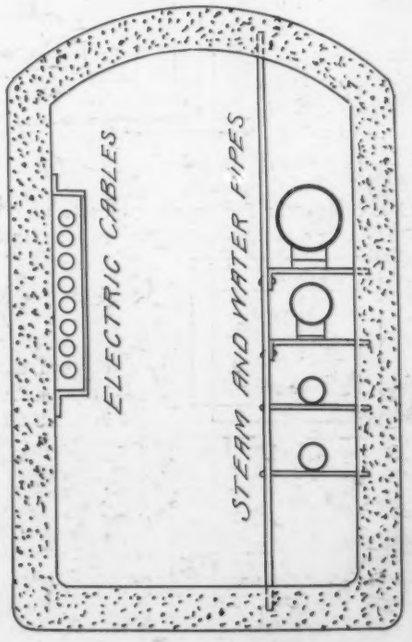
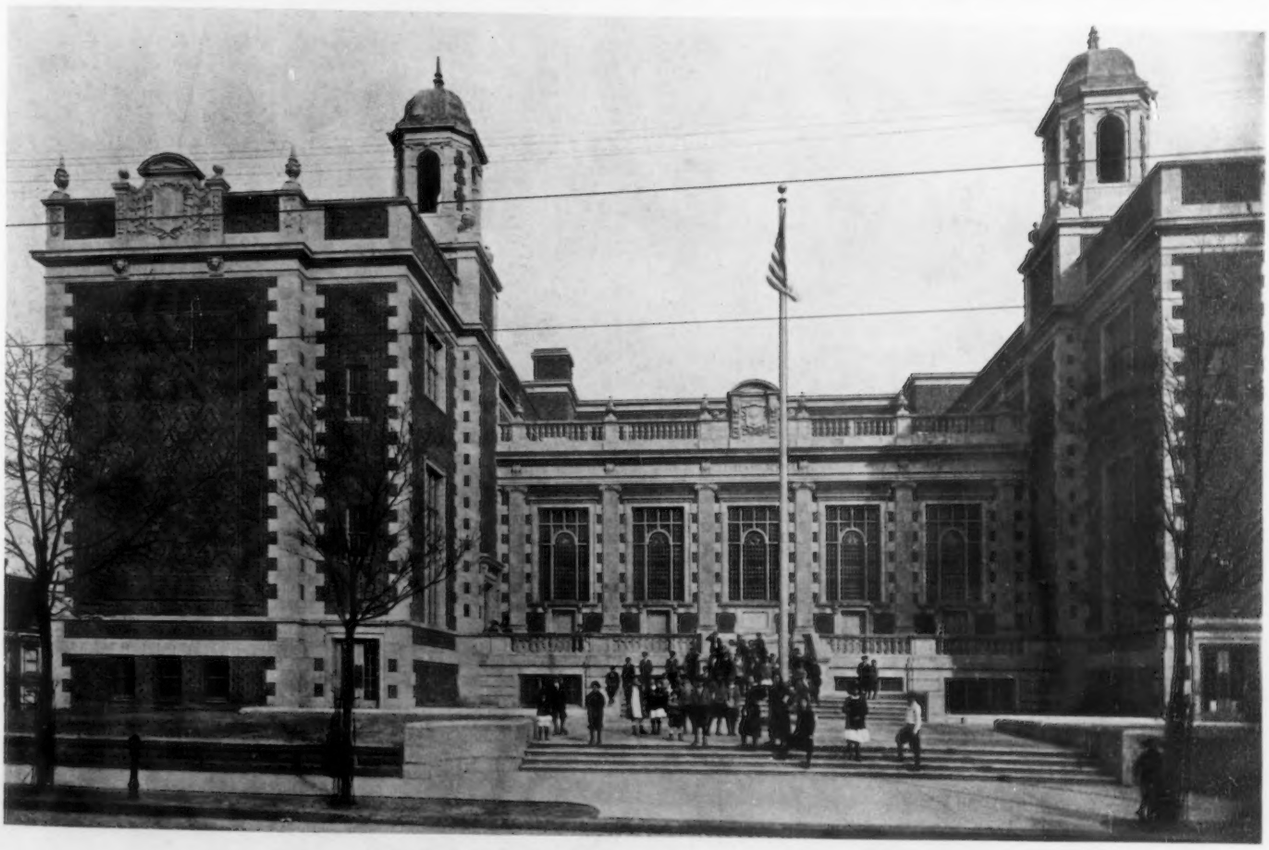


FIG. X.



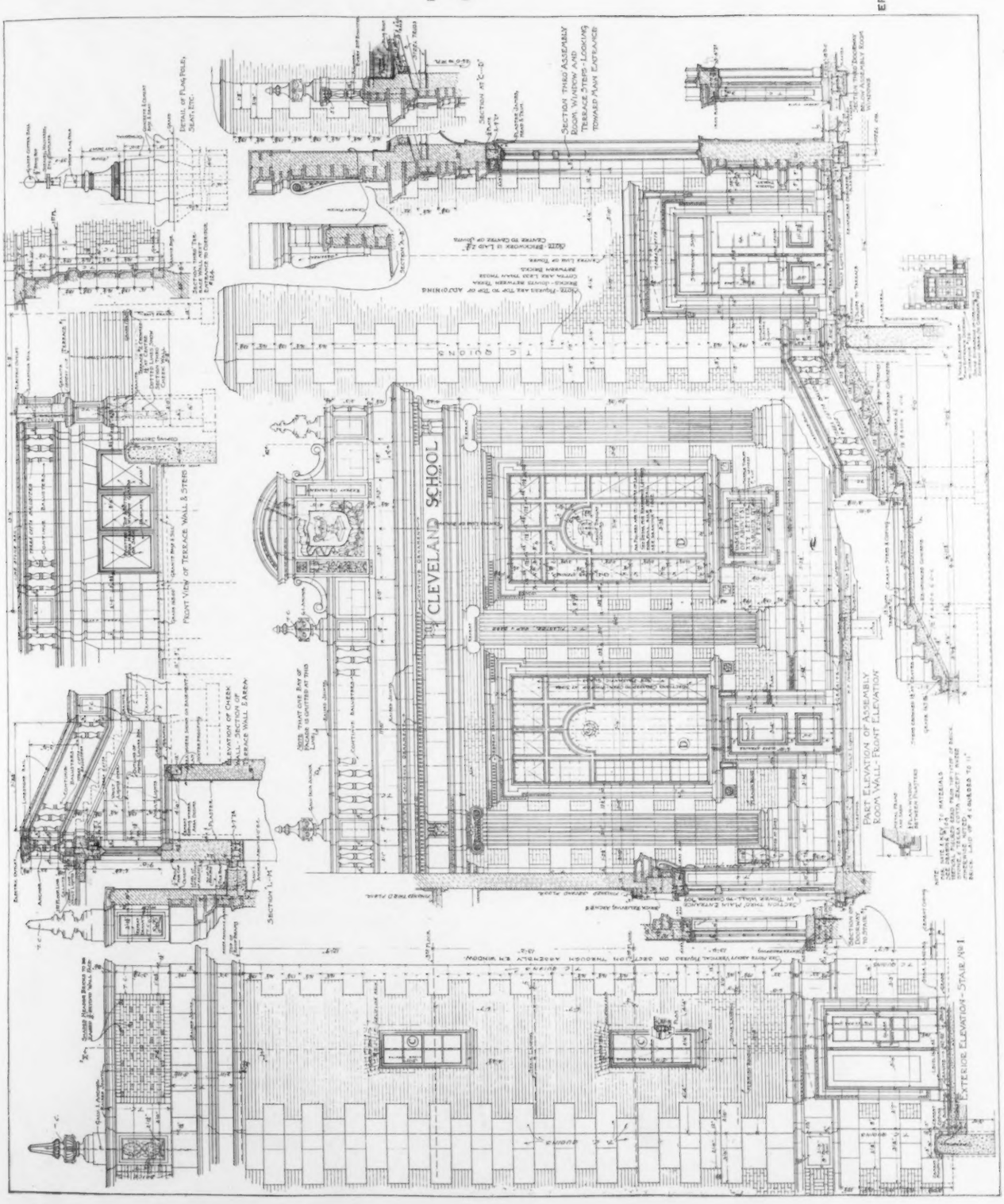
THE CLEVELAND SCHOOL, NEWARK, NEW JERSEY
ERNEST F. GUILBERT, ARCHITECT

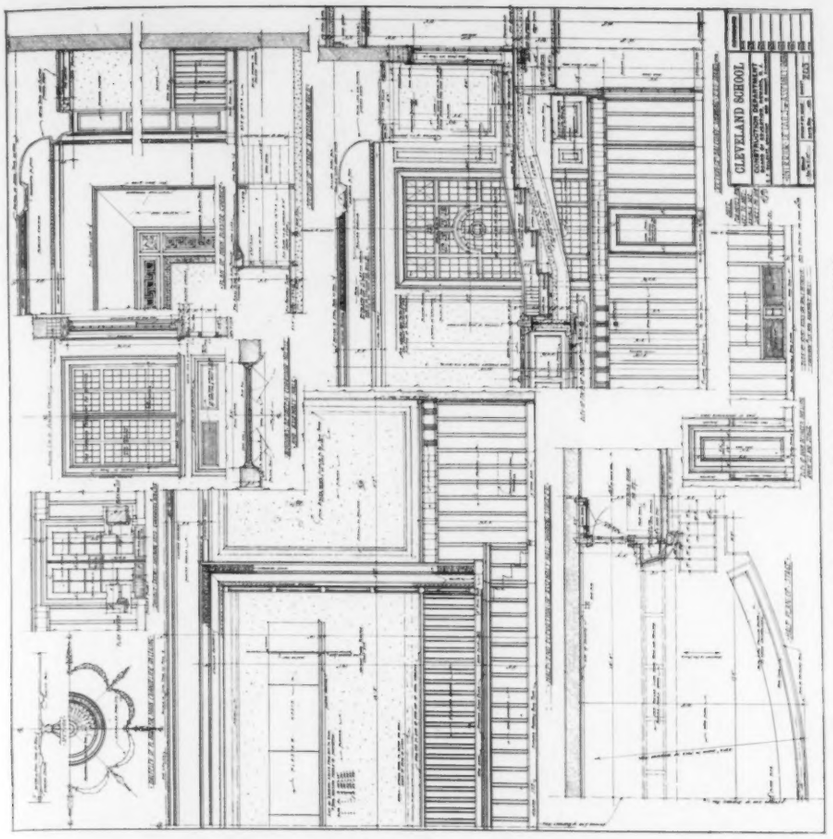
THE CLEVELAND SCHOOL

NEWARK NEW JERSEY

EXTERIOR DETAILS OF FRONT ELEVATION

ERNEST F. GUILBERT ARCHITECT

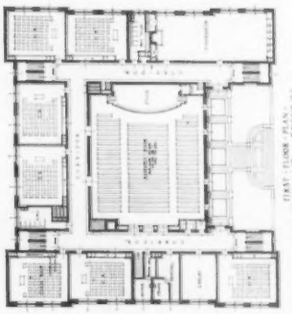


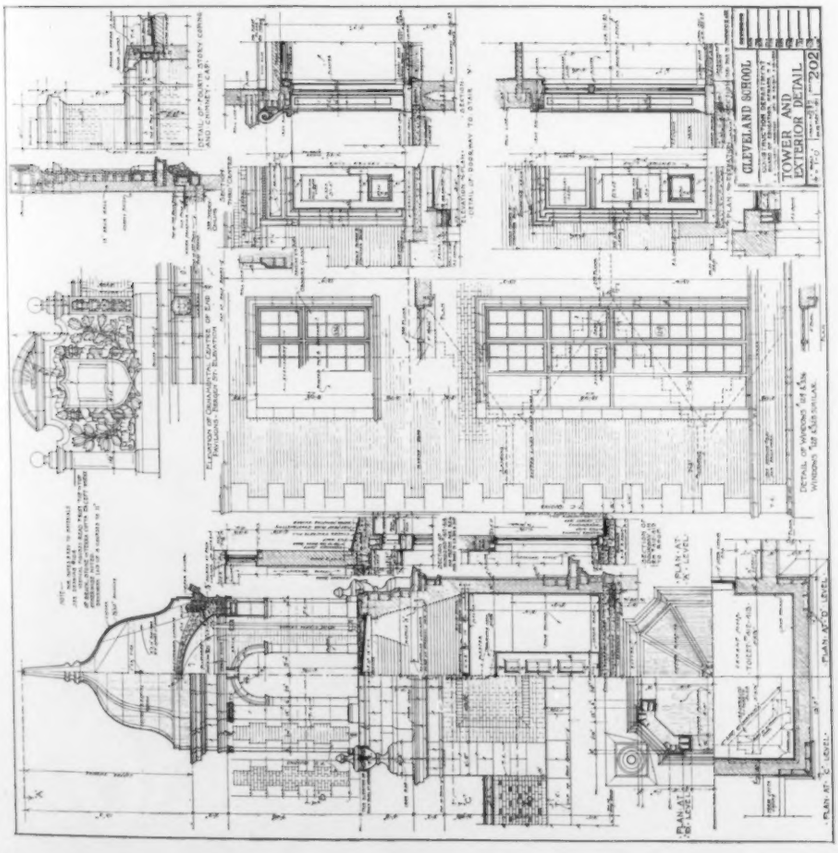


INTERIOR DETAILS OF ASSEMBLY ROOM

ERNEST F. GUILBERT

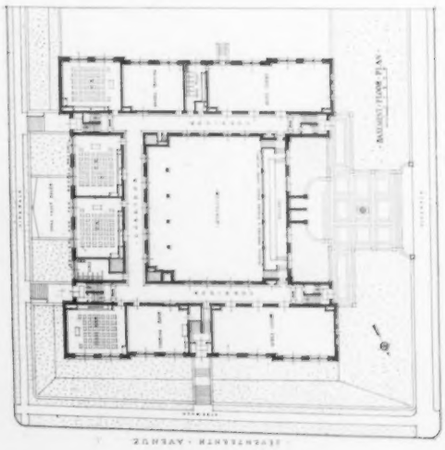
ARCHITECT

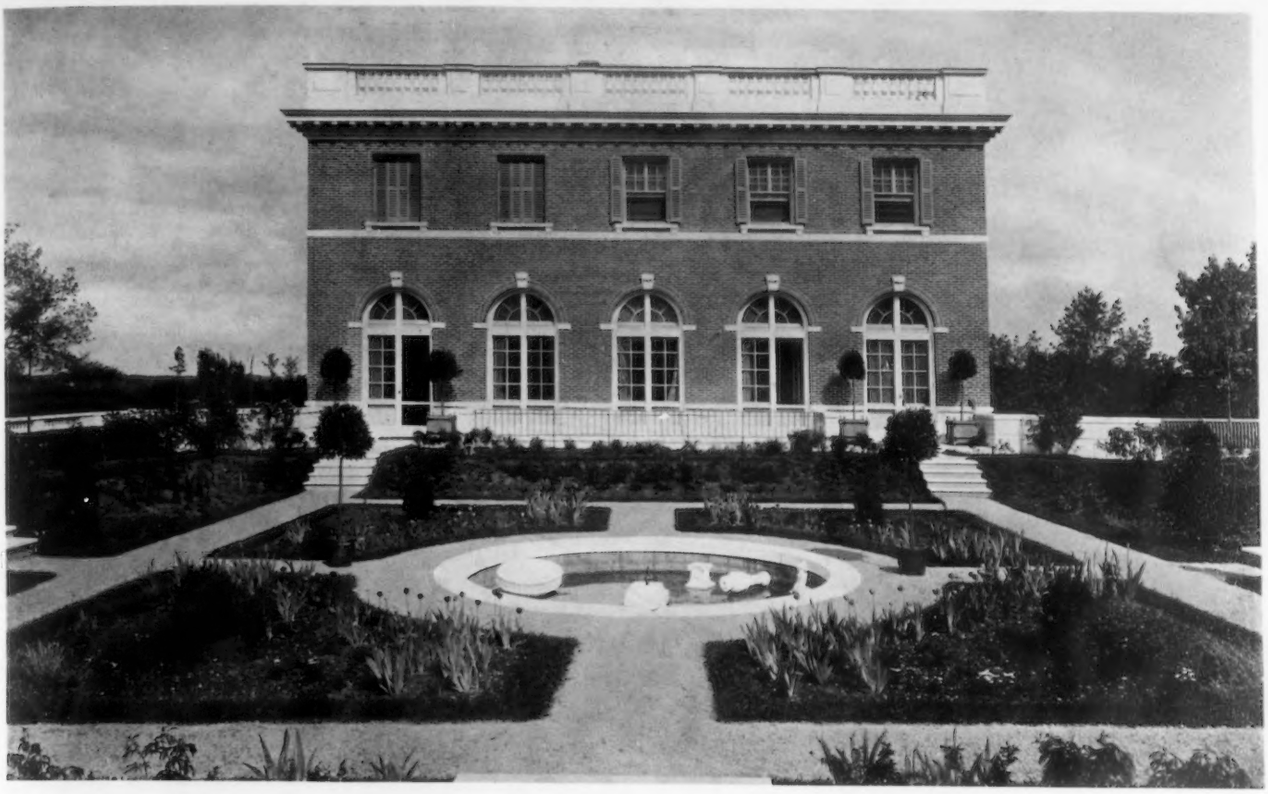


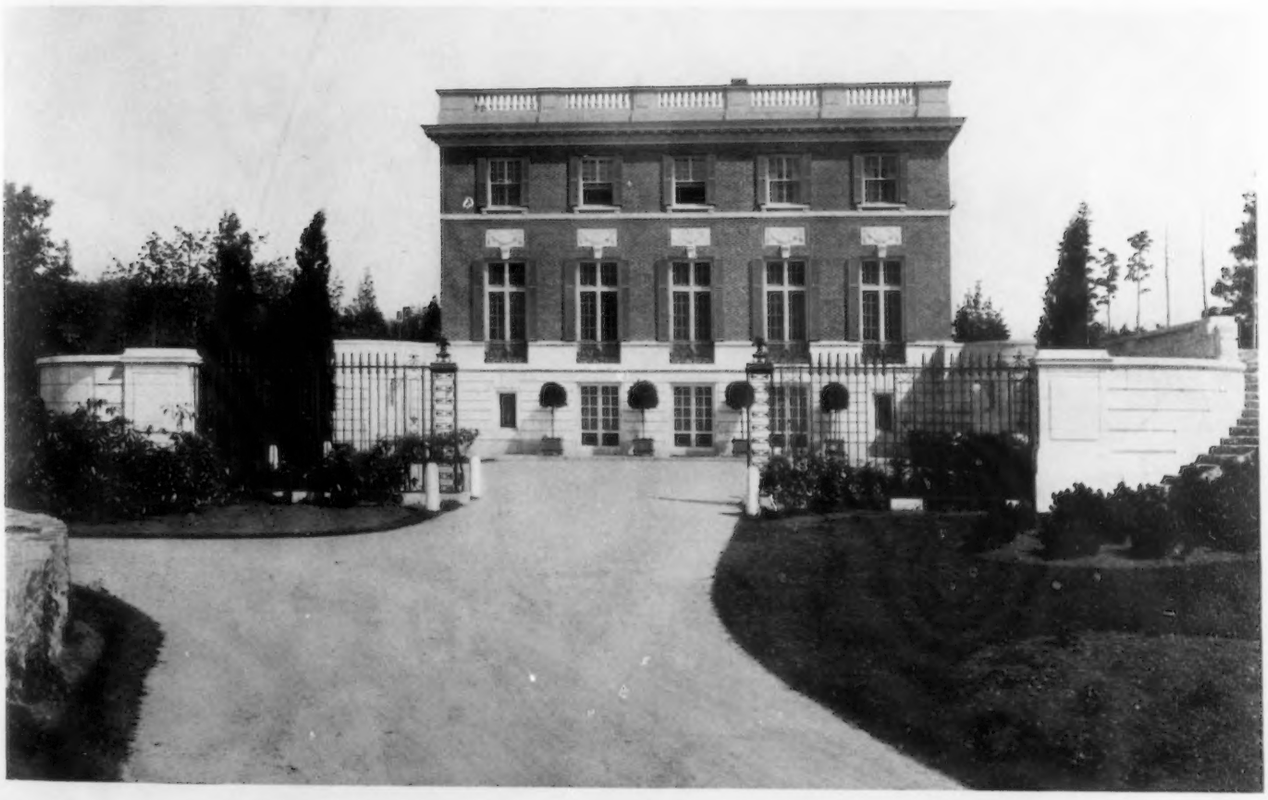


THE CLEVELAND SCHOOL

NEWARK NEW JERSEY

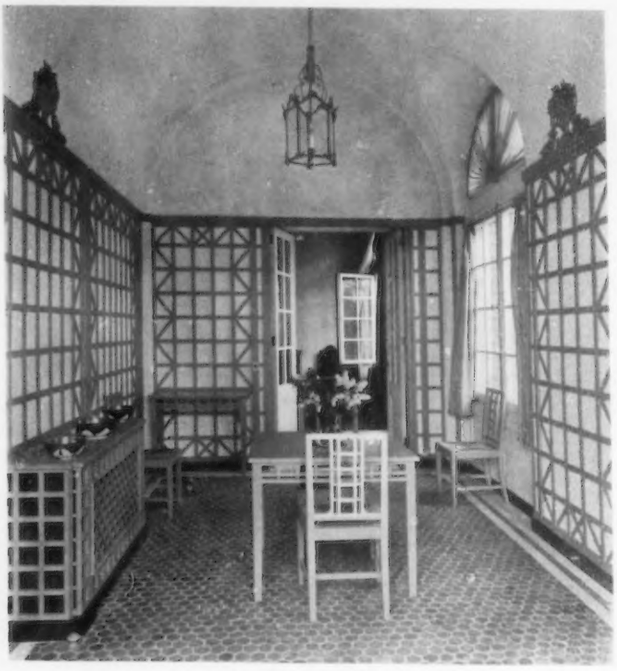




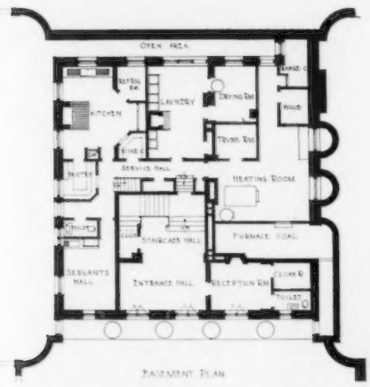


HOUSE AT MILTON, MASSACHUSETTS
BIGELOW & WADSWORTH, ARCHITECTS

LIBRARY



LOGGIA



BASEMENT PLAN

FIRST FLOOR PLAN

SECOND FLOOR

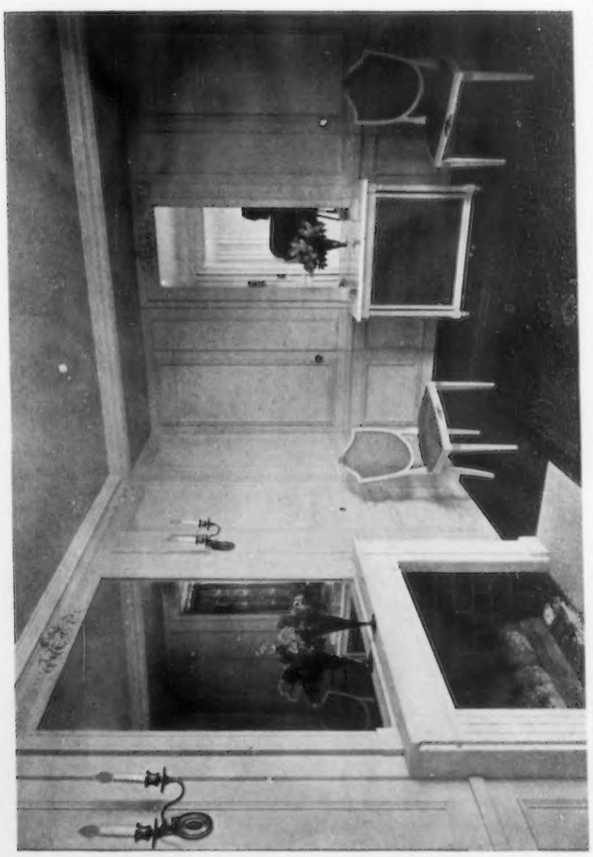
HOUSE AT MILTON, MASSACHUSETTS

BIGELOW & WADSWORTH, ARCHITECTS

BEDROOM

STAIRCASE HALL

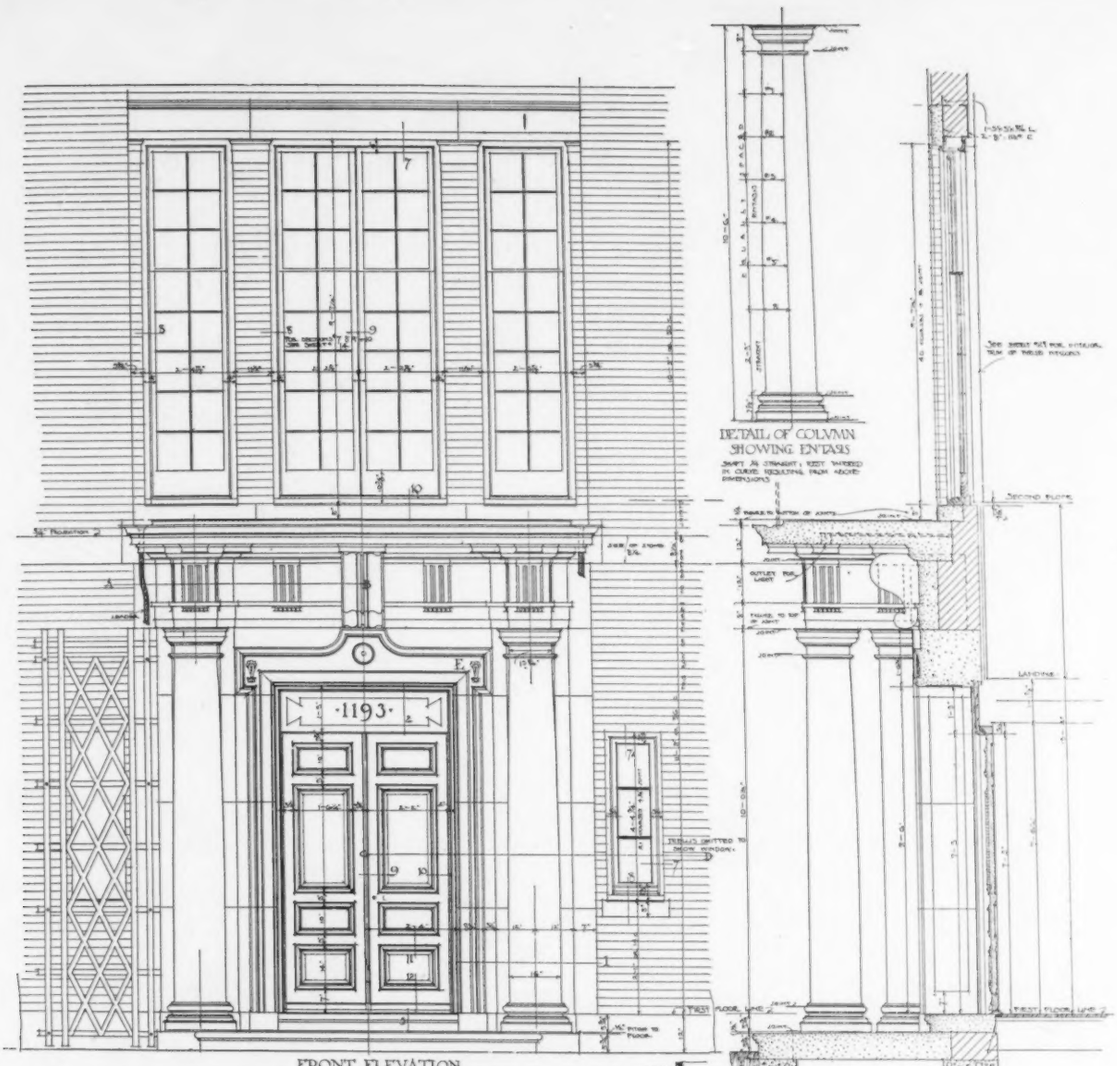
LIVING ROOM

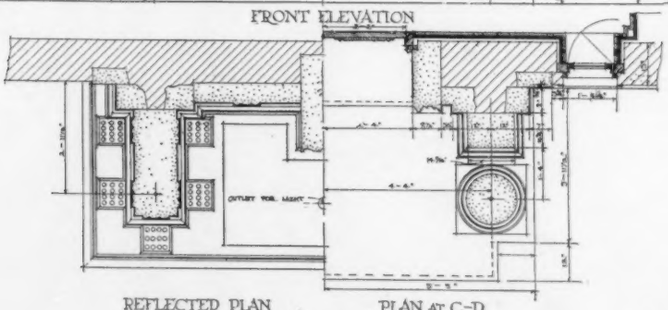


RECEPTION ROOM

HOUSE AT MILTON, MASSACHUSETTS
BIGELOW & WADSWORTH, ARCHITECTS

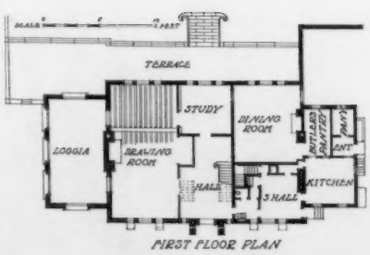
HOUSE AT BUFFALO, N. Y.
CHARLES A. PLATT, ARCHITECT





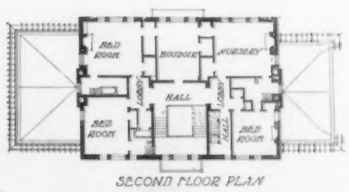
¾" SCALE DETAILS OF
WEST ENTRANCE

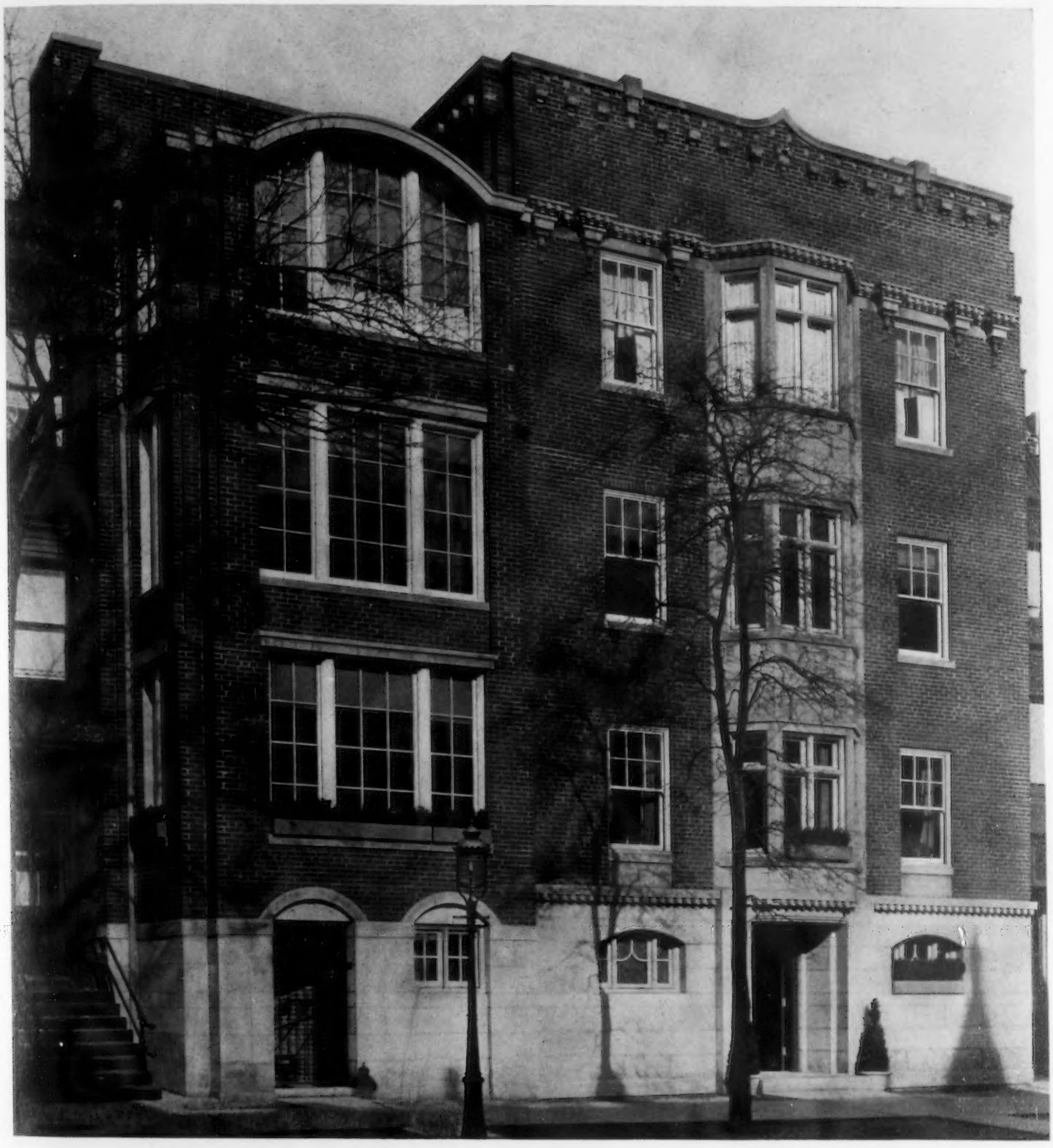
DETAIL OF MAIN ENTRANCE

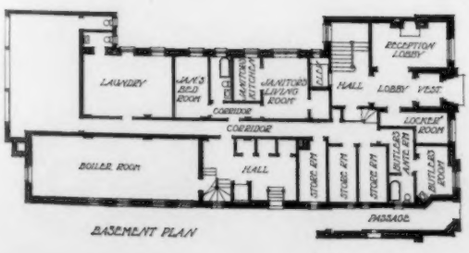


HOUSE AT BUFFALO, N. Y

CHARLES A. PLATT
ARCHITECT

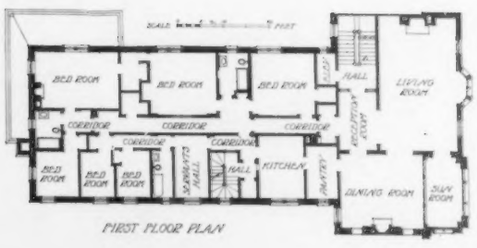


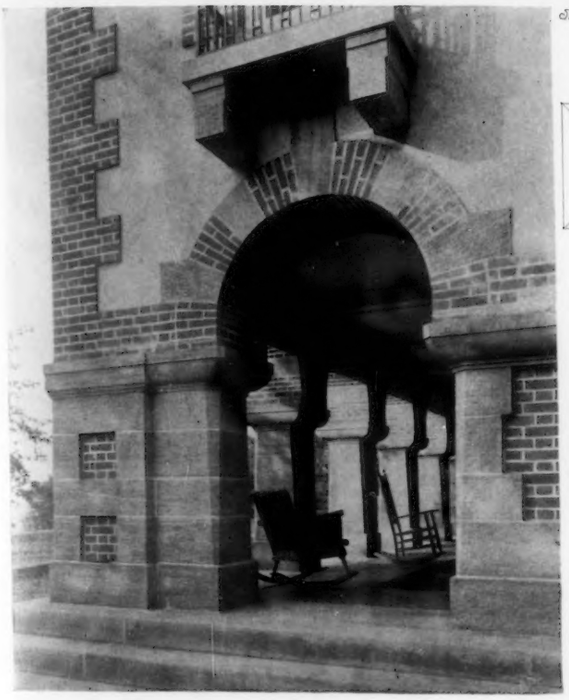


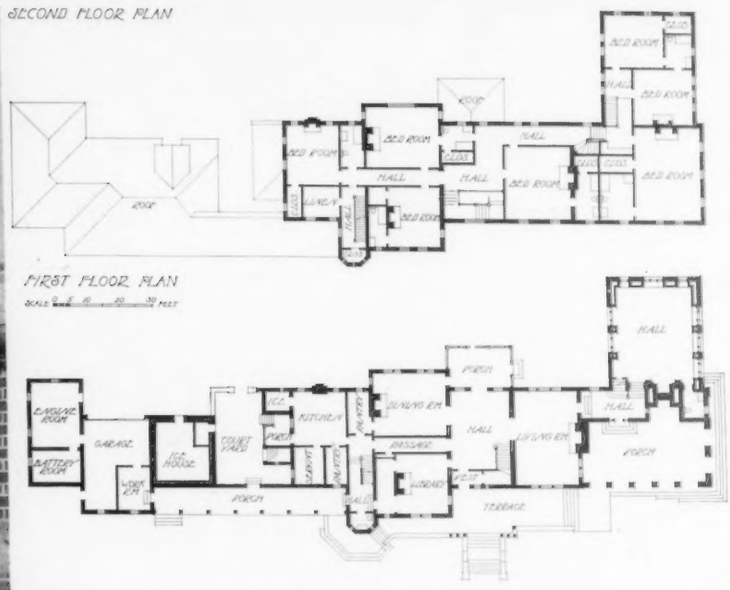


APARTMENT
AT
CHICAGO, ILL.

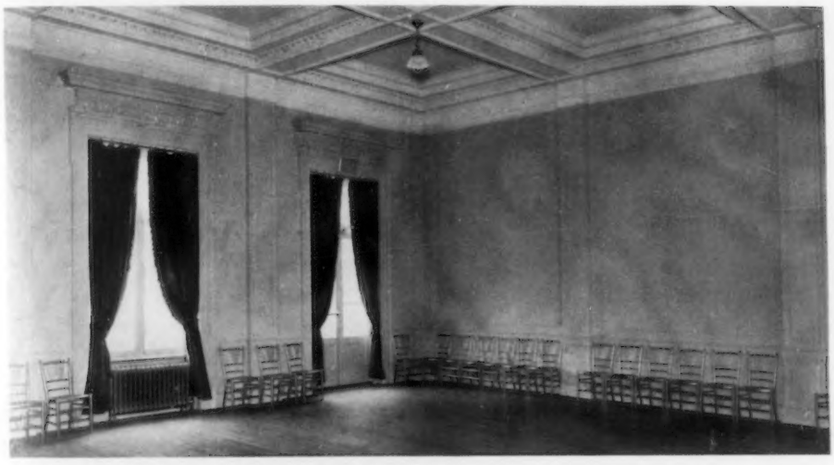
POND & POND
ARCHITECTS

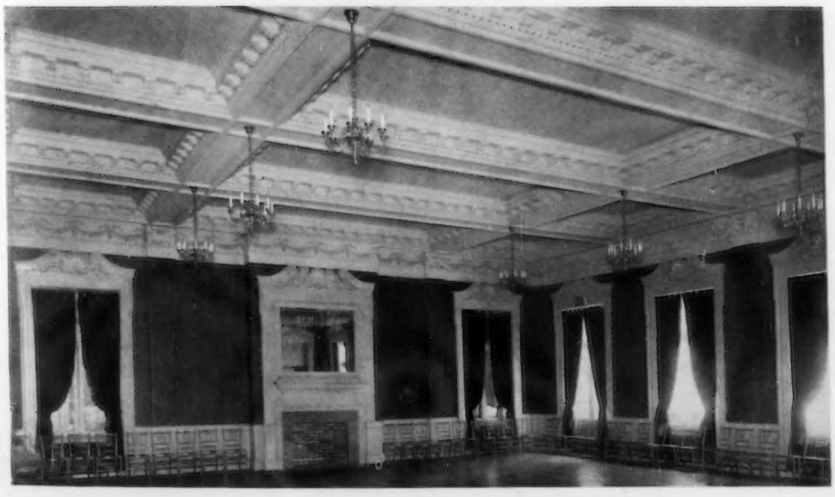


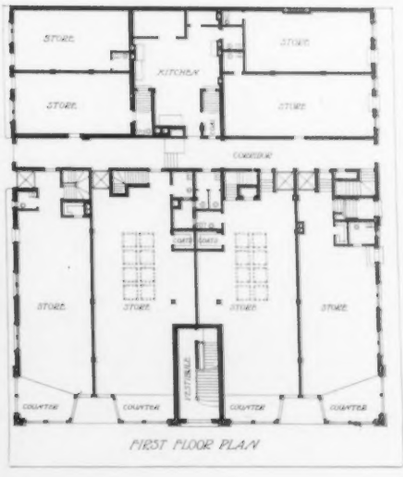




HOUSE AT CLEVELAND, OHIO
ABRAM GARFIELD, ARCHITECT

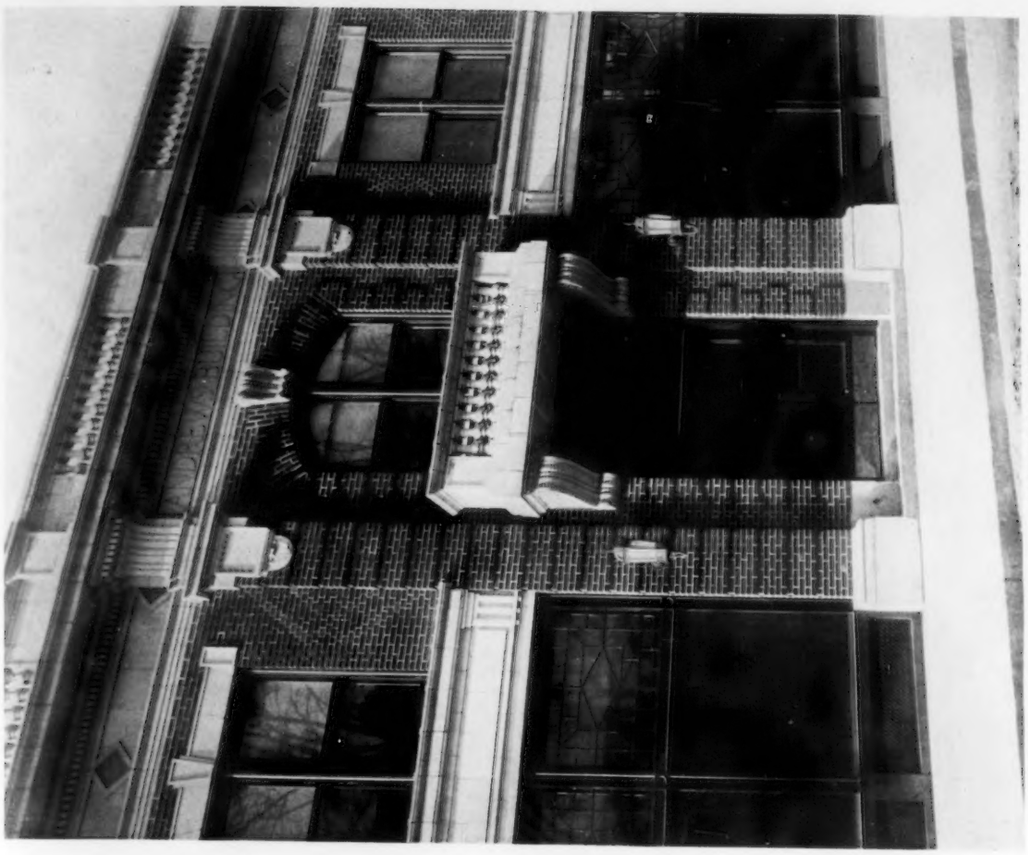






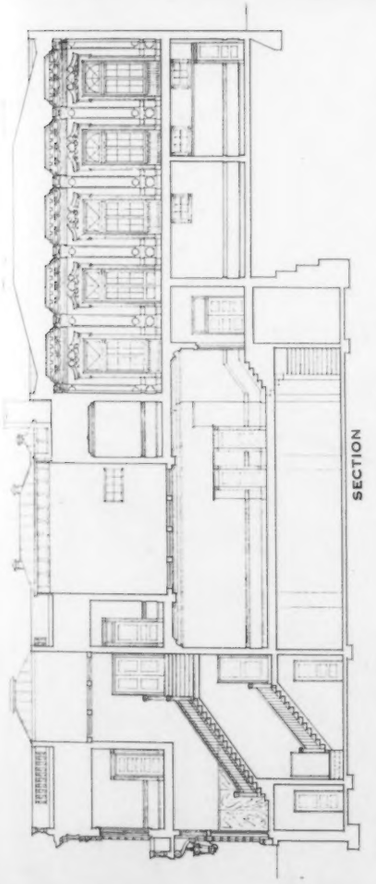
THE ANDREWS BUILDING, PROVIDENCE, RHODE ISLAND

JOHN HUTCHINS CADY, ARCHITECT



ENTRANCE DETAIL

THE ANDREWS BUILDING, PROVIDENCE, RHODE ISLAND
JOHN HUTCHINS CADY, ARCHITECT



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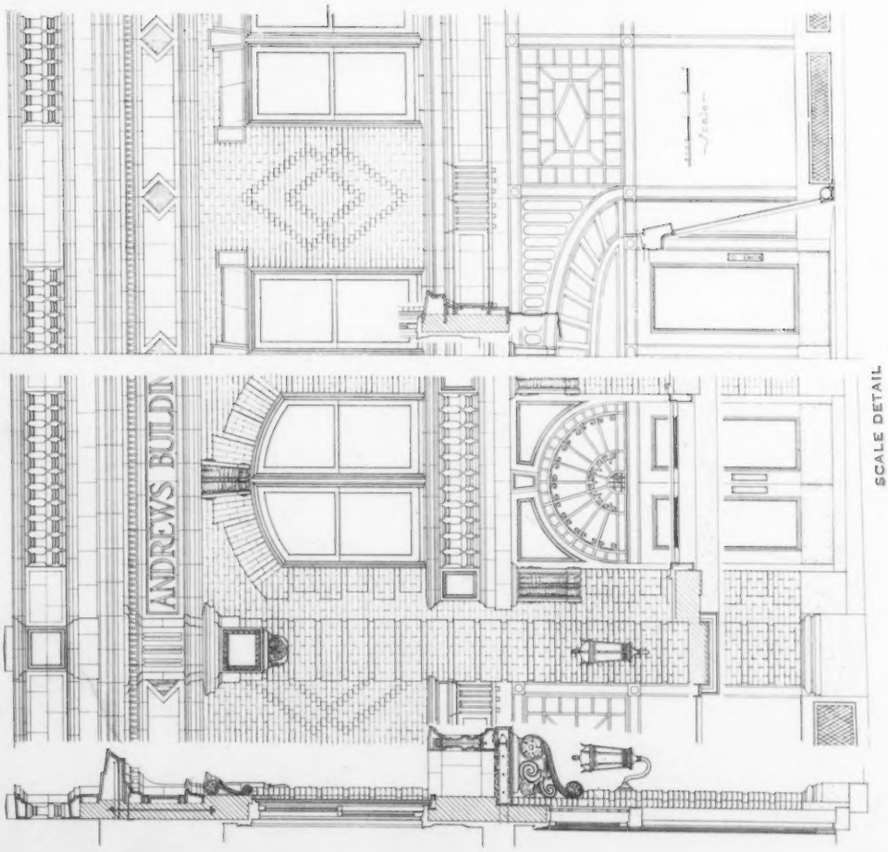
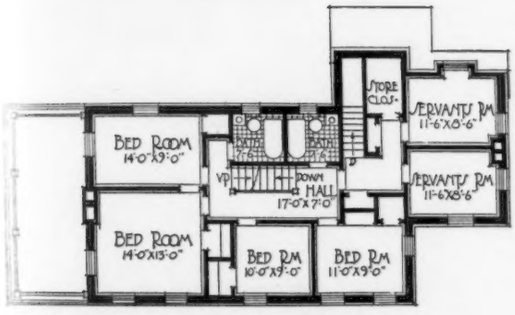
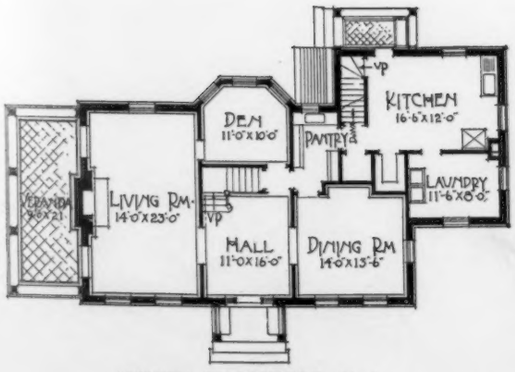


SCALE DETAIL





HOUSE AT ORANGE, N. J.

MANN & McNEILLE, ARCHITECTS

An Old English House—The Vyne.

BY R. RANDAL PHILLIPS.

A FEW miles from the town of Basingstoke, in Hampshire, is an old brick house which takes us back through different periods to Tudor days, a house interesting alike for its architecture and its historical associations. Henry VIII and his great Cardinal are commemorated on the panels of its Oak Gallery; Anne Boleyn and Elizabeth were among its royal guests; while in Stuart times it was the meeting-place of many notabilities, brought together by its then owner, Chaloner Chute, Speaker of the House of Commons, under Richard Cromwell. This triple historical connection is displayed in the house itself, which offers us successive periods of building. First in order is the Tudor work of the early sixteenth century, then comes the Elizabethan and Jacobean, followed by the later Renaissance, and finally the early Georgian.

Having been altered extensively over so long a period, it is difficult now to say exactly what was the original disposition of The Vyne, but it would seem to have been roughly ⌐¬ shaped. Early Tudor work is seen on the garden front—more especially on the chapel which juts out from one end of the house—and later Tudor work on the entrance front, with its diaper in the brickwork. On the entrance front the alterations made in successive years are clearly apparent, as in the sash windows which have taken the place of the original mullioned windows, and on this front, too, we see the doorways, which are among the chief work that was carried out by John Webb—who was Inigo Jones's nephew, and his right-hand man. The latest work of all is the imposing hall which Chute, as one of the dilettanti of the mid-eighteenth century, is credited with.

The original house was built for Lord Sandys, who lived during the reigns of Henry VII and Henry VIII, and of this the Oak Gallery is a delightful relic. It is particularly interesting as being a very early example of what became so familiar a feature of the old English house. In length about 82 feet, it is lined with linen-fold paneling enriched with carved monograms, mottoes, and badges. Altogether there are more than four hundred panels, including one, of exceptional interest, with two amorini supporting the arms of England. On another are the arms of Wolsey, with his cardinal's hat, and on another the arms of Catharine of Aragon: all showing the new Italian influence, which was then making its way into England. The date of this gallery would appear to be about 1520, so that it ranks among the earliest of its kind. Of about the same date is the work in the chapel.

A large chimney-piece in the Tapestry Room brings us to the Elizabethan period, and there are other similar relics about the house, while in the dining-room we see Jacobean work: in which connection it may be noted that the architecture of the hundred years from 1520 to 1620 was tentative in character. As Professor Blomfield remarks, the builders were losing their old tradition and had not yet replaced it by a new one, and on the other hand a certain sense of expansion and intellectual enfranchisement in the air at the time tempted them to bold experiments for which they were ill-equipped.

THE PILLARED STAIRCASE HALL.

Webb, as already pointed out, made extensive alterations to the interior of The Vyne, but its most prominent feature belongs to a later date: the pillared staircase hall having been added in the middle years of the eighteenth century. It is very typical of its period — a time when the nobleman was taking up architecture as a polite part of his education, a time also of unreality and theatrical effect. Nevertheless, there is no denying the impressiveness of this staircase hall which John Chute added about 1760. Whether he was the actual designer cannot now be stated, but we know that he was a man of parts, and, with the help of some practical hand, it is very probable that he did produce this design. The Corinthian columns are very elegant, and the enrichment on the frieze and the coffered ceiling displays a nice taste in ornament; but, bearing in mind that The Vyne is not a very pretentious house, one feels that the staircase hall is too stately, and Horace Walpole's criticism of it, as being too "theatric," has much to warrant it.

THE OAK GALLERY.

As it stands today the main part of The Vyne belongs to the period of John Webb, by whom the interior was extensively remodeled. He also added the large portico which rather overpowers the garden front of the house, and designed the elegant brick pigeon-cote and the lodge. Webb having based his work so much on his master's, it is now impossible to determine precisely the authorship of many designs, and, as a consequence, great confusion exists as to whether it was Webb or Inigo Jones who made them; but in the case of The Vyne there is little doubt that Webb was solely responsible for the work. In some of its details there is noticeable a lack of refinement which Inigo Jones would not have been guilty of, and the great portico on the garden front could never be attributed to "the father of English architecture." Webb was a conscientious architect, intelligent, but not profoundly original. He worked in the manner he had learned from Inigo Jones, a manner admirable in itself, but most difficult to handle, and there is little trace in his work of the learning and consummate reticence of his master. Yet he came of a splendid school, and nowhere is the saving influence of tradition more clearly seen than in the work of pupils of great exponents of architectural design.

Here then we have an old house of much interest, a mellow piece of brick building over-grown in part with ivy and creeper, a house which has lasted out the pageant of nearly four hundred years, yet still offers us its ancient record as a lasting testimony to the work of men's hands.

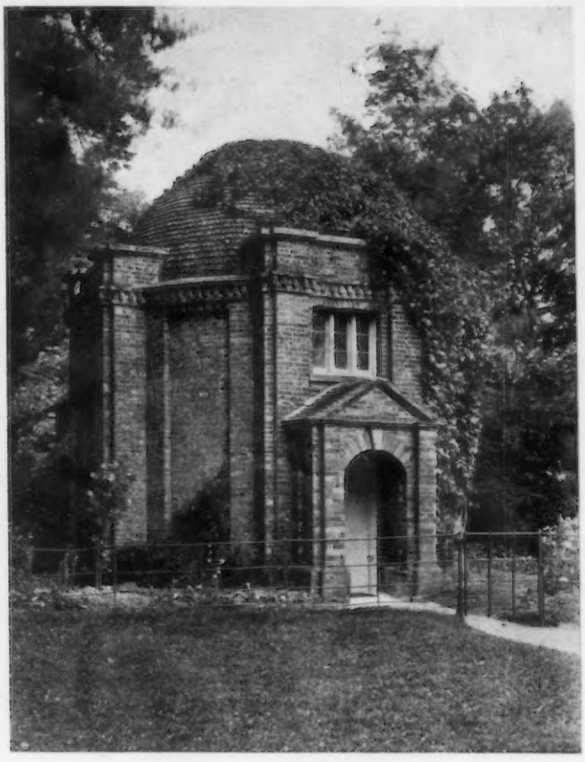
DINING ROOM.

GARDEN FRONT

DETAIL OF ENTRANCE FRONT

AN OLD ENGLISH HOUSE—THE VYNE, BASINGSTOKE, HAMPSHIRE

PIGEON COTE.



THE LODGE.

THE VYNE, BASINGSTOKE, HAMPSHIRE, ENGLAND.

Architectural Jurisprudence.—Part I.

AN ARCHITECT'S COMPENSATION AND LIABILITIES.

BY WILLIAM L. BOWMAN, C.E., LL.B.

Error of opinion may be tolerated where reason is left free to combat it.—*Jefferson.*

UNLIKE the laws of Nature and of her forces which are constant and concurring, the statute and common laws of man, as made and applied in the various States of our Union, are as diverse as the points of the compass, and they are often interpreted directly contrary in adjoining jurisdictions. It is for this reason that it is unwise and unsatisfactory to attempt to make general statements concerning our laws or to give general advice as to personal conduct and procedure. Added to this difficulty, arising from such diversity of laws and its applications, is the fact that almost no differences between men arise but have their distinctions from similar situations that have previously arisen; hence one can realize that the best of general opinions will be of little use for application to any specific case. However, a study of the laws and of the decisions under various circumstances furnishes certain landmarks, as it were, which are helpful in guiding the layman. It is the object of this article to point out to the architect some of these "landmarks" pertaining to his demands for compensation, the statutory protection of his compensation, and his probable liability to the owner and others. It is hoped that by the use of these suggestions some disputes and consequent law-suits may be avoided, especially as such troubles are destructive of that peace of mind and mental condition which permit a proper artistic atmosphere and truly expressive conceptions.

The contract between the architect and an owner should always be in writing and complete in all its details. If the writing is complete in itself it is important to remember that there is a rule of evidence which in such cases rejects all consideration of what was talked about or agreed upon previous to the making of the writing. In determining what the writing means it is considered as a whole, but at the same time each phrase or word is given its proper attention and significance. A good example showing the way a contract will be interpreted involved the following facts. In a letter the architect proposed to prepare plans, specifications, and supervise certain construction work for a three per cent commission. To the letter was added as a postscript, "Payments to be made on monthly estimates." When the plans and specifications were completed, the architect demanded two per cent as then due him under the usual custom of payments to architects. The court decided that he was not entitled to any pay until monthly estimates were made; hence the suit was dismissed with costs against the architect.

There was no question but that the architect had meant to make the contract so that he would get the usual compensation for the plans and specifications and then his percentage for the supervision on each monthly estimate; but he did not state it clearly, and consequently did not receive his pay for the plans and specifications at the time expected.

Full consideration of this simple case teaches us three fundamental lessons: first, that a contract is strictly construed as it reads; second, that no custom of architects can change or modify a definite agreement; and third, that legal action to try and get a partial payment is poor business policy, often resulting, as it did in this case, in the loss of the supervision work, and in having to pay attorney's fees and court costs out of the "reasonable value" which the architect later received for the work done.

Throughout this discussion we shall assume that the architect has a contract for employment and that he has faithfully complied with his part of such agreement.

Where the contract is merely for preliminary sketches and specifications or even for detailed plans and specifications, it is customary to state that the compensation of the architect shall be a certain percentage upon the "estimated cost" of the work. These important words were considered as follows in an architect's case: "The estimated cost we understand in this case to mean the reasonable cost of buildings erected in accordance with the plans and specifications referred to and not necessarily the amount of some actual estimate made by a builder, nor an estimate agreed upon by the parties, nor yet an estimate or bid accepted by the defendant (owner)."

This opinion then shows that under certain circumstances, and especially if technical objections are not made, builders' estimates are some evidence of reasonable value. There are so many conditions and motives that enter into builders' estimates that, as a matter of fact, these estimates rarely represent what they should, namely, the cost as determined by a reasonable man who is capable of making such determination. It is recommended, therefore, that when an architect renders his bill for such services under such a contract the "estimated cost" be a "reasonable cost" which can easily be supported and approved by impartial experts having no interest in either the architect or the owner.

Where there is a limit of expense fixed by the owner, and where as is usual the lowest bid to do the work is higher than the cost limit, there are two questions involved: Can the architect recover anything for his work, and if so, how much? The first question depends on whether the lowest bid is the "reasonable cost" as just discussed, and also whether there has been a "substantial performance," or such performance by the architect of his agreement with the owner as should require the owner in justice and equity to pay for the work. No general rule can be given as to what will be considered a substantial performance by the architect in such cases, but as a working rule it is suggested that for cost limits less than $5,000 the excess of the "reasonable cost" should be kept under fifteen per cent; while for cost limits above $5,000 such excess should be kept under seven and one half per cent. Where these percentages are exceeded it is questionable whether the architect can ever recover anything for his work unless the owner accepts the work and waives his contract right to keep the architect within the cost limit imposed. Architects doing public work are all familiar with the rule that public contracts must be kept within the appropriation for the work; otherwise there may be no pay for work done in excess of the appropriation. In private work the same rule should govern the action of the architect in making his plans and specifications, thus leaving the excess cost allowed in such work to become available in cases where there are increases in the cost of materials and of labor between the time of drawing the plans and the letting of the building contract. Naturally, if the cost limit is materially exceeded the architect should at once offer to make the changes necessary to bring the plans and specifications within the limit. In rendering his bill the architect is always safe if he only demands his percentage on the cost limit, and that should be the practice where there is not much difference to him. Some courts, and especially in competitive work, restrict the compensation to a percentage on just that figure. This suggestion would seem to be good also in the case where the architect intended to supervise, because many an architect has lost his supervision by demanding his percentage on some builder's bid which may or may not have been a reasonable estimate.

In cases where there is no contract or agreement either written or oral as to the amount to be paid for the architect's services, the law implies that the owner shall pay the reasonable value of the work done. In such cases it is usual for the architect to charge in accordance with the schedule of the American Institute of Architects. Those charges, however, are not binding upon the owner unless it can be shown that he was familiar with them or with the usual and customary practice of architects to make such charges where there is nothing said as to compensation. In defense, the owner can show and is entitled to know the amount of time spent on the work by the architect and his assistants, his expenses, etc., so as to see whether the charges made are reasonable. It is therefore advisable before rendering bills under these circumstances to consider what hourly or daily charge is being made, and if found excessive it is good legal as well as business policy to make a reasonable bill for the services actually rendered.

In cases where orders for plans and specifications are countermanded soon after being ordered, or in fact at any time prior to the completion of the work, there is great difference of opinion as to what compensation the architect is entitled to. Some states seem to hold, contrary to their usual rule in ordinary breaches of contracts, that the architect can only recover for the work done prior to the receipt of the countermanding order. Of course no architect should do any work after receiving such an order. The usual rule of law applicable to a breach of contract of this kind states that the architect is entitled to his full contract price less what it would have cost him to fully perform and also less what he might in the meantime have earned elsewhere. The changing and shortening of the manner of expressing this rule is probably largely due to the fact that it is seldom that the architect can show that he was unable to get other work to take the place of that countermanded, and since he cannot show any damage suffered by such countermand he is left with only his claim and right to receive and recover the reasonable value of the work actually done with the outlay of expenses made. This same rule of law is also applicable where the architect supervises as well as draws the plans. Under these conditions a bill rendered reasonable in its demand and solely for the work actually done will often save time and trouble for all concerned.

The chief difficulty which is likely to arise in such a contract comes from the common expression "actual cost."

What does it mean? Strange to say, judicial definitions are rare, but in one case it was decided to mean the total cost of the completed buildings including permanent appliances and fixtures. In another case it was held not to include damages given in a law-suit to the contractors for delay caused by the owner even though the damages were measured by extra expense in the construction caused by increase in cost of materials and in the cost of labor. Under the Revenue Laws, "actual cost" is defined as the actual price paid in a bona fide purchase and not the market value. Again it is defined in another similar case as "money actually paid out." These definitions applied to a building operation would exclude from the "actual cost" those materials which the owner does not actually pay for in money. By the schedule of the American Institute of Architects they use the term "total cost" instead of "actual cost" and then state that "the total cost is to be interpreted as the cost of materials and labor necessary to complete the work, plus contractors' profits and expenses, as such cost would be if all materials were new and all labor fully paid at market prices current when the work was ordered." Where this schedule is called to the attention of the owner, then it becomes applicable and solves this opportunity for great difference of opinion. The term "total cost" does not seem to have as yet received wide and common usage and no judicial definition has been made of it.

Suppose the owner by advice of the architect gives the construction work to several parties and thus dispenses with the services of a general contractor; after starting work one of these contractors quits the job and a new contract for the same work has to be made at a much higher price on account of new conditions discovered underground; the financial irresponsibility of the defaulting contractor prevents the owner recovering the excess cost from him: is the architect entitled to charge his percentage on the "actual cost" which includes this excess cost caused by this combination of circumstances? There seem to be no decisions on such a case, but from analogy to somewhat similar conditions passed upon by some courts an architect's fee should not be based upon such excess cost. It is only fair to say that slight modification of the facts given for this suppositive case would probably require the contrary decision and it is practically impossible to say, what a court would find if required to pass directly upon that question or modifications of it.

Strange to say, there is one state where there seems to be no definition for "actual cost," although there are numerous decisions that the architect's compensation must be paid upon that basis. They also hold that such "actual cost" must be proven and therefore reject any evidence as to statements of the estimated cost, amounts of probable cost filed with a building department, or expert opinions by architects or builders.

In this condition of the law on this subject, the only advice that can be given is that only those items or elements of the construction as are set forth and specified in the plans and specifications should be considered, and their actual cost should be taken unless it is excessive, due to some unexpected and uncontrollable circumstances as heretofore mentioned, or due to mistakes of the architect himself. Hence it is very evident that some judgment has to be used in determining just what items the architect will take when making up the "actual cost" upon which to base his compensation. It often becomes more a matter of business policy than of technical legality.

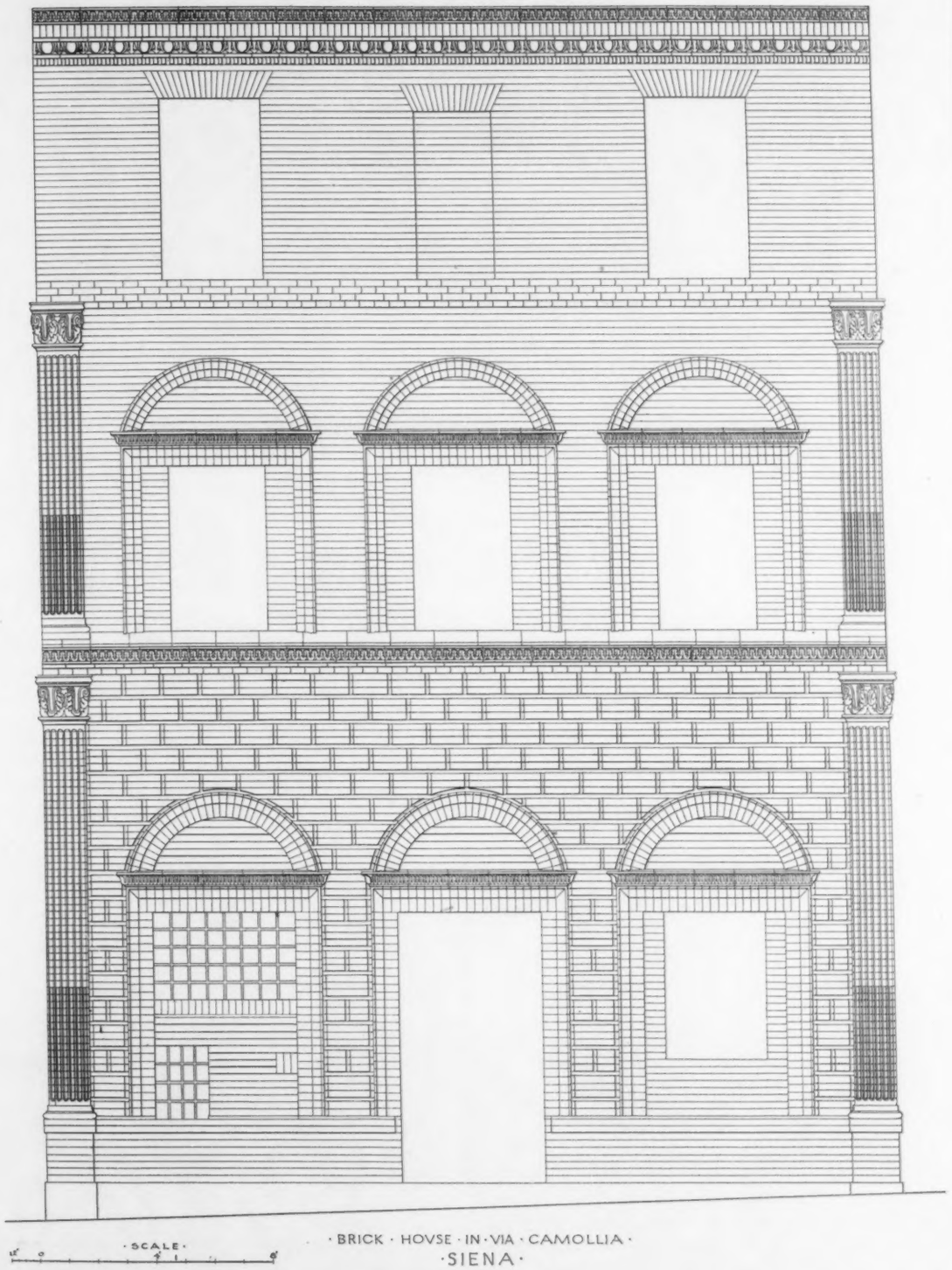
Since the architect deals with the owner of real estate, he does not ordinarily have the same difficulties as other people in collecting his pay for his services. In the every-day business life the first inquiry of a seller is as to the financial condition of the purchaser. The architect usually foregoes that inquiry. Still there are many chances taken to-day by an architect with the numerous notoriously crooked and insolvent real estate companies, corporations, etc., seeking his services for the improvement of heavily mortgaged lands. Then it is that the architect appreciates whatever statutory protection is given him. The best protection, when it is granted, is given by the right to put a lien on the property improved, or about to be improved. Another protection is sometimes afforded by the means of legal processes called "attachment" and "garnishment."

Most of us are familiar with the protection given contractors, sub-contractors, material men, and laborers by statutes which are commonly called lien laws. By them the property which is increased in value by buildings, etc., is itself held by the law to pay for such increase of value, at least to the extent of the owner's contract with the contractor. Is an architect entitled to that protection for his services in preparing the plans and specifications and in superintending the construction of the work? No general answer can be given to this question as the different statutes are differently worded, and often when similarly worded are interpreted differently. All such statutes can usually be divided into two general classes: one which protects "any person performing labor" upon building construction, and the other which specifies, for protection, certain persons as "mechanics, laborers, etc." This classification is helpful in our inquiry since, under the first class, architects are protected, and under the second they are not. Thus it would seem from the recorded cases that at present where the architect has an entire contract both for preparation of plans and specifications and also for superintendence, and fulfils both of these services, he is entitled to a mechanics lien in fifteen states. On the other hand, Iowa, Kentucky, Massachusetts, Missouri, North Carolina, and Tennessee deny an architect the help of the lien law under such circumstances.

Suppose the architect merely prepares plans and specifications, is he protected by the lien law for such services? It would be expected that if the buildings are not erected there should be no lien, but Wisconsin seems to allow a lien even then. Where the construction work is completed according to the plans and specifications there is about an equal difference of opinion in the reported cases.

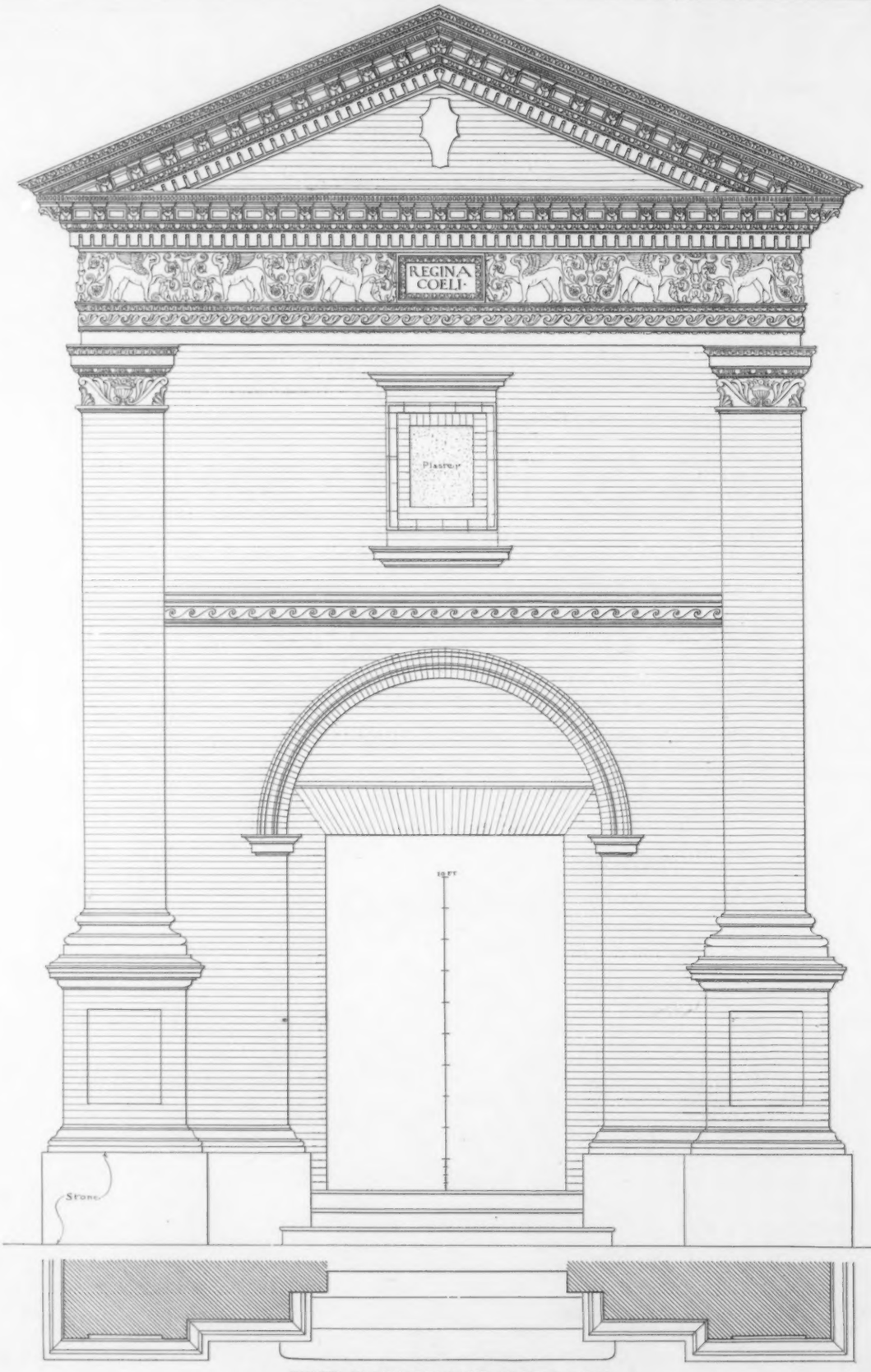
Where the architect merely superintends the construction work it is certain that he would be protected in those states where he is benefited when he draws the plans and superintends. New York, Rhode Island, and Oregon seem to help the architect in such a case, upon the theory that such services are actually performed upon the construction work in contradistinction to the work done in making the plans and specifications which is all performed in his office.

These considerations of the various lien laws show that for definite and safe advice concerning one's rights thereunder the architect must consult local counsel.

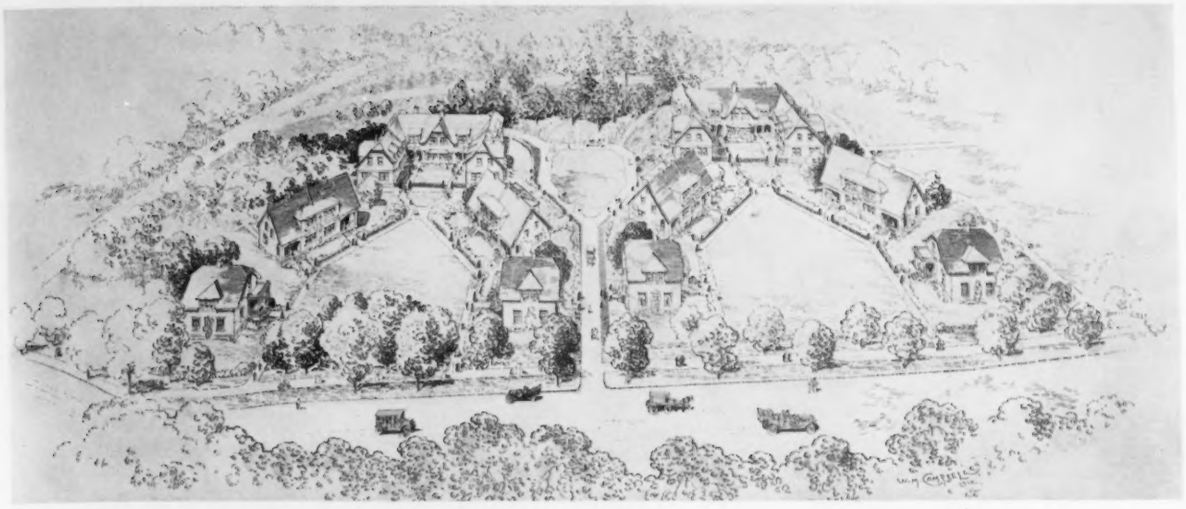


MEASURED DRAWINGS – ITALIAN SERIES

WILL S. ALDRICH, DEL.



CHAPEL OF THE PLAZZO DEL DIAVOLO, SIENA
MEASURED DRAWINGS—ITALIAN SERIES
WILL S. ALDRICH, DEL.

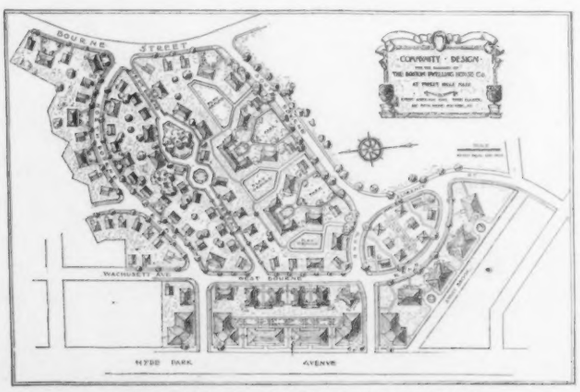


Two Groups of Houses Built for the Boston Dwelling House Company.

KILHAM & HOPKINS, ARCHITECTS.

THE shabby and neglected appearance of the outlying parts of our large cities always causes wondering comment from foreigners whose eyes, accustomed to the thrift and neatness of the Continent, are shocked by the ugly architecture and general lack of neatness which characterize too many of our suburbs. Even what is considered one of the best of Boston's industrial suburbs drew forth the exclamation "*Ah, que c'est triste*," from a Frenchman whose perceptions had not been dulled by too long residence in America.

Since last year, however, the suburbs of Boston have witnessed the inauguration of an intelligently directed attempt to create an addition to their number which shall, while providing attractive habitations for a respectable class of citizens, prove an object lesson to the real estate promoters whose slovenly developments have, by their cheap and meretricious appearance and early deterioration, ruined so much of the charming country which originally surrounded the city. In common with many other American cities, Boston has suffered from thoughtless and ill-ordered expansion of its cheaper residential districts, but in one way its experience has been peculiarly painful, for instead of housing its people in individually owned cottages, its suburbs have been built up with miles on miles of wooden three-story apartment houses, containing one apartment on each floor. These buildings, which are generally of the flimsiest construction, are known locally as "three-deckers" and are permitted by the local ordinances to be built as near as 6 feet apart and, by juggling the lot line, have in some cases approached each other even nearer. When new they are sometimes convenient and comfortable, but are subject to early depreciation, soon grow shabby and form vast areas of construction as combustible as a Philippine village. Their insidious march, like a fell disease, has ruined most of the real estate around the city.



PLAN SHOWING ENTIRE DEVELOPMENT.

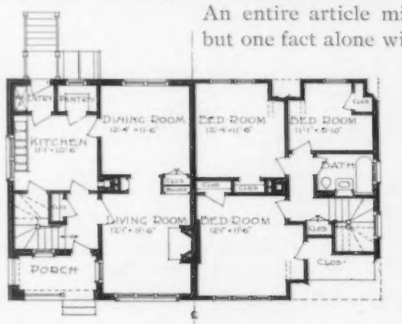
To combat this unhealthy state of affairs and to provide, as an example for investors, a suburb which should be charming, picturesque, practical, and a real asset to the city, improving and holding up values in its vicinity instead of depreciating them, a company of some of the most far-seeing and public-spirited men and women of Boston organized last year a strong corporation known as the Boston Dwelling House Company and acquired a property of some thirty acres near the Forest Hills Terminal of the Elevated system, which had been known as the Minot Estate. This property is high, with gravelly soil, well drained, and was largely covered with a splendid growth of old pines and other ornamental trees, as many as possible of which have been preserved.

Prettily winding roads were laid out and the "lotissement" was designed in such a way as to provide for groups of cottages — single, double, and in blocks, each having its own garden plot of rather limited size but with rights in large open squares or playgrounds which assure

GENERAL VIEW, BRICK HOUSE GROUP, FOREST HILLS, MASS.

not only plenty of air and sunlight but ample playing space for children. The site for each house was carefully gone over in advance, not only by the architects and engineers, but by real estate experts as well, and the orientation of each separate house received thoughtful and expert study.

The ends of the company would not be attained if philanthropy were its only object. Unless a reasonable return were shown on the investment, the promoters could not hope for imitation. This has been fully provided for, and its financial success is assured.



A portion of the property abuts on Hyde Park avenue, one of the main thoroughfares leading south from Boston, and as the front land here was considered unsuitable for cottage development it was utilized for the erection of a new type of low-priced apartment houses which have met and conquered the three-decker on its own ground, both in cost, convenience, and appearance. An entire article might be written on this subject alone, but one fact alone will be of interest here. A little intelligent study showed that instead of crowding the buildings together with only 6 feet between, exactly the same number of suites could be gotten on the same land with 25-foot intervals between the buildings if a new type of plan were used. Although the new type conflicted with the building law, to the credit of Boston's Board of Appeal, be it said that it was warmly approved and its success was shown by the fact that every one of the seventy-two suites was applied for before they could be finished.

Back of the apartments, on rising ground sheltered among the great trees, a considerable number of cottages,

SEMI-DETACHED HOUSES, FOREST HILLS, MASS. TYPE "C".
Kilham & Hopkins, Architects.

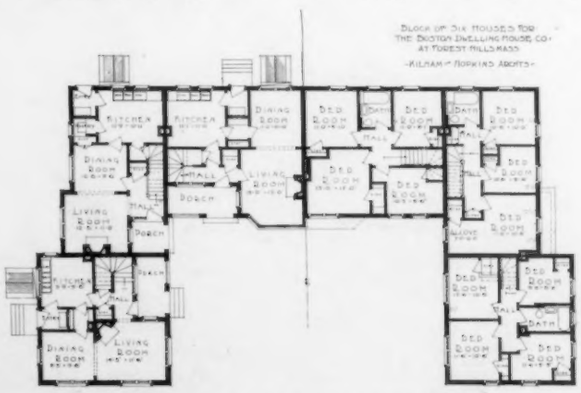
both of brick and of hollow tile construction, have been built, of which the two groups herewith illustrated form the subject of this article. An interesting fact in connection with their construction was the investigation of plans and costs in England, where so many model villages have been built. It was found that a Letchworth house without cellar, hallway, closets, bath room, electricity, or furnace cost 7½*d.* or 15 cents per cubic foot, while the Boston houses, also built of brick and with slated roof, containing all these things, cost no more and were better.

These twenty-four brick houses are built in two groups around separate courts; both groups, however, are tied together and related by a common service driveway. The houses are so placed that the views from any side of the houses clear the next adjoining house, giving an uninterrupted view of the trees and planting around the courts, and, in fact, throughout the rest of the property, as the houses are situated on one of the highest terraces and over look the surrounding country for miles. The view obtained by the special placing of the houses, while very satisfactory, also is very important as to the question of the uninterrupted sunlight and air.

BLOCK OF SIX HOUSES, FOREST HILLS, MASS. TYPE "A".
Kilham & Hopkins, Architects.

Each group of twelve houses is made up of two single houses and two double houses and one six-family semi-detached house. All these houses are built with 8-inch brick walls, laid up in wide white joints. The roofs are covered with a light sea-green slate, and the outside flashings are of copper, and the finish is the best obtainable. Porches to each house are provided both at the front and in connection with the kitchen.

The single houses, as shown by the views accompanying this article, consist on the first floor of a good-sized parlor and a somewhat smaller dining room which are joined together by a large doorway, each one helping the other to give the appearance of an ample suite of rooms. The dining room has a high batten dado with plate rail and ornamental glass buffets. Opening from the dining room, with pantries between, is the kitchen with its own pantry and back entry for refrigerator, etc. In front of the kitchen is the front hall which contains the staircase to second floor, an ample coat closet, and opens directly into the living room. The second story consists of three chambers with large closets opening off each one, a bath room fitted up with a wood dado and up-to-date white steel medicine closet with mirror. Off the corridor is a well-equipped linen closet consisting of shelves, drawers, and cupboards. Above in the garret is a space for storage. The living room is provided with a fireplace, the facing of which is built of brick.


BLOCK OF SIX HOUSES FOR
THE BOSTON DWELLING HOUSE CO.
AT FOREST HILLS MASS.
KILHAM & HOPKINS ARCHTS.
HALF · FIRST · FLOOR · PLAN · HALF · SECOND · FLOOR · PLAN ·
TYPE A

The double houses have an ample porch which is included under the main roof of the house. On entering the house from the porch, the front hall contains the staircase, coat closets, and opens directly into the living room. The general layout of kitchen and dining room is similar to that of the single house with the exception of the kitchen, which is somewhat larger. The second story of these houses also contains three chambers and bath rooms with fittings similar to the single houses. The living room in these houses also contains a fireplace similar to that in the single house. The six house block is laid around a small court very much in the form of those built in England to-day, and consist in general of the same

arrangement as those in the previous mentioned single and double house type, with the exception that on two of the second floors four chambers are provided instead of three as in the other houses.

All of these houses are provided with light, ample cellars, with a hot air furnace and store closets and bulkheads leading out to the back yard.

The courts are provided with brick walks running around and connected with each separate dwelling, while in the center is a large open space 150 feet square for light and air, benefiting all the houses, giving them the same outlook that a much larger piece of land would give if owned separately. These courts are already planted with a variety of hardy shrubs and trees which, together with the vines now planted against the brick walls of all the houses, will next spring undoubtedly give as pleasing an effect as can be seen in any high-class residential suburb in America.

Between the groups of houses and at the opposite ends of same are driveways, over which all the teaming and delivery of supplies will pass. In the middle of these driveways are open spaces which are used for playgrounds for the children, and may be used in common by all of them.

The service and clothes yards are all located along these service driveways, and will not spoil in any way the effect of the fronts of any of the houses. Also, as these groups of houses are built on rising terraces, even the windows on the service driveways will look over and beyond the houses next below.

In locating these houses, the greatest care has been taken to preserve the wonderful old trees that occupied the ground before the buildings were started. Most of these trees have been preserved and give the whole community the age and dignity which is only obtained after years of patient waiting on most tracts of lands used for similar houses.

All the houses are connected with underground electric and telephone service in conduits. The gas, sewerage, and water supply are an integral part of the carefully developed sanitation of the entire estate.

The cost of the buildings is one of the most interesting and instructive parts of the whole proposition. It was found that these substantial brick houses which, with their slate roofs, are practically fireproof, can be built under proper up-to-date business management on the part of the contractor — where a large number are built at the same time — for no more per unit than the isolated single or double wooden houses of the same capacity which have been built on the nearby properties.

These attractive houses with from 2,300 to 3,300 square feet of land, all graded and with shrubbery and lawns complete, with the added value of rights in the ample restricted areas all around them, can be bought for the small cost of from $4,800 to $5,400. And not only that, but an easy form of payment has been drawn up by the company, whereby a purchaser can buy his house with very small first payment and successive small yearly payments, which are applied annually towards the final complete ownership of the building. Moreover, properties in the settlement are not subjected to depreciation of values owing to deterioration of the character of the neighborhood, for the estate is so large that it automatically guarantees itself against injury by the possible lowering of the character of the outside surroundings.

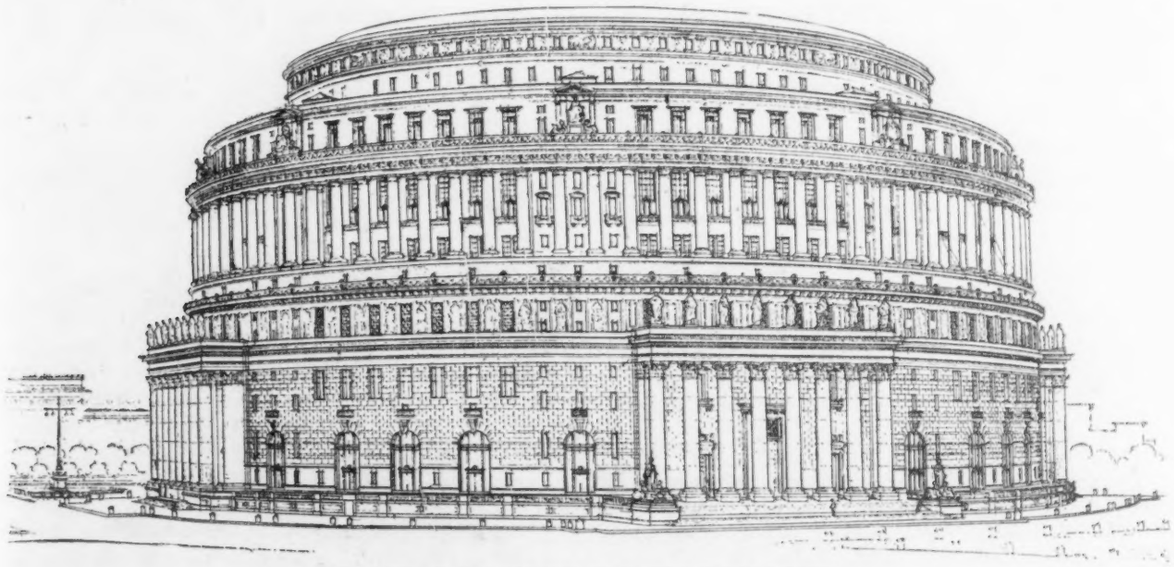
SINGLE HOUSE, FOREST HILLS, MASS. Kilham & Hopkins, Architects.

EDITORIAL COMMENT AND NOTES FOR THE MONTH

THE NEW YORK COURT HOUSE.

MR. GUY LOWELL, in his competitive plans for the New York Court House, has undoubtedly surprised the public by choosing a round form. He makes no attempt to justify his choice on grounds of beauty alone. He modestly rests his work on use and convenience; on imperative demands for light and air and inner quiet and easy passage from apartment to apartment. Herein he follows good precedent. For the ancients, to whom he frankly says he owes his inspiration, seem not to have used the circular ground plan instead of the rectangular unless they found it much better suited to heighten the unity of the space inclosed. But these were not the reasons for Mr. Lowell's choice. His plan differs from the earlier instances in one essential respect: while mausoleum, pantheon, and amphitheater enclose an openly continuous interior, the new court house packs within itself, tier on tier, a myriad of economically dovetailed rooms, offices, and passageways. Viewed from without, the vast building will be impressive for its mass; but viewed from within it will be impressive for its ingeniously complicated contents.

Having chosen the round plan, Mr. Lowell had but little chance of making his court house appeal to popular tastes. The circle is a curve so rigorous and so simple in its law



ACCEPTED DESIGN FOR THE NEW YORK COURT HOUSE.
Guy Lowell, Architect.

the building's main purpose. The Greeks, except for hillside theaters and for tombs, did not use the rotunda; they had not developed the allied arch and dome; the Romans used the round plan as means to an end, rarely if ever as an end in itself. So, too, the older Italians, for church and baptistry, adopted the eight-sided, the ten-sided, or the smooth circular plan for reasons like those that led the Druids to set the gray monoliths of Stonehenge in concentric circles, or that led the French to choose the round plan for their Pantheon at Paris and for Napoleon's tomb. For circles, whether of rude stone or of polished columns, and the unbroken wall recurving into itself, give a strong central emphasis on altar or font or memorial. The radial arrangement also, and the simple lighting, as to harden any form into which it enters. Avoided by the Greek architects, it was taken up uncritically by the Roman engineers. But even the Romans, fond as they were of stiffly-rounded arch and vault, would not wall their noble colosseum with a hard circle; they softened the outline into an ellipse. Moreover, the mechanically drawn circle is not only uninteresting in itself, it is intolerant of other forms. There never yet stood a circular building that could make a straight-lined portico a true part of itself.

We have no right to ask Mr. Lowell to regard the beauty of his elevations as more important than the convenience of his floor plans. And we must all applaud the high skill with which he has made his own the uncommonly severe conditions of the competition.

THE time was, when the ordinary civilities of life would have made it a pleasant duty for one publisher or one publication in a given field to extend the hand of good-fellowship and a cordial greeting to a newcomer in that field. Lest we forget altogether this honored custom we take this opportunity, belated though it is, to welcome to the architectural publishing field, *The Journal of the American Institute of Architects*. Undoubtedly there exists in this field a lofty and vacant niche which needs to be filled, and it is our hope that the new Journal of the Institute will fully meet its oportunity. Judged by the three numbers at hand, it will.

If in commending we may be permitted to counsel; if in bespeaking success for the new enterprise we may wish to point out briefly some of the pitfalls, we shall do it with malice toward no one, but rather with the hope that an uplifting influence in our midst may be helpful to all.

While certain existing publications have striven to obtain a high standard of ethics that would give an inspiration to the architectural profession, there are those that have lamentably failed, either because of their wilful disregard of the best interests of the profession they claim to serve, or else because of an inherent weakness in their editorial policy. It is better always that scolding should give way to wholesome criticism, criticism that is honest and intelligent. It is not enough that a publication which, is presumed to be laboring in behalf of a dignified profession, should put forth repeatedly, as apparently its only claim for right of recognition, the hackneyed and inconsequential claim that "we published it first." If they must hitch their existence to one single declaration of purpose, let it be, rather, "we published it best."

That *The Journal of The American Institute of Architects* under its present editorial management will ably serve the best interests of the architectural profession along lines that have been too long neglected by those who have been blind to their opportunities, we feel assured. That it will bring a new dignity to the architectural publishing field is beyond doubt. It is for these reasons, particularly, that we bid it welcome.

MR. MORGAN'S RELATION TO ART.

MR. ROBERT W. DE FOREST, in speaking at the Morgan Memorial Meeting of the New York Chamber of Commerce, said, among other things:

To those who only looked at Mr. Morgan from a single angle, whatever that angle might be, he bulked so large that they thought they saw his whole stature. But from whatever point he was viewed there could only be seen a small fraction of his great personality.

To the world of business he seemed the embodiment of some Titanic force, whether it operated to save the credit of a nation or to re-create a great enterprise.

To such a world it must have seemed inconceivable that this same person could halt his great business projects to admire some small work of art, and could lay aside both business and art to play with his grandchildren, or to caress his favorite dog.

But such was the real Mr. Morgan. To him it was not incongruous to assemble the forces which stayed the panic of 1907 for that famous all-night session at his library in the company of a placid Madonna of Raphael and a delicate statuette by Donatello. There were two of Donatello's statuettes in his favorite corner. He loved them and was wont to say they reminded him of his own children.

Mr. Morgan was easily the greatest art collector of his time. Was it the mere pleasure of possession, the ambition to have and be known to have the choicest objects of art, which attracted him? No, not primarily, though such pleasure and such ambition there must have been. He loved art for art's sake. His taste was highly cultivated and rarely erred. He trusted his own judgment in selection, and his mental operation was as intuitive and instantaneous when applied to the purchase of a picture as to a business transaction.

For a long time past Mr. Morgan has been a great help and inspiration in matters architectural. His patronage and material financial help have aided in building up the American Academy in Rome.

IN an address just given by Dudley McGrath, architect of Brooklyn, before the Architectural Department of Pratt Institute, being one of a series of lectures arranged by the Brooklyn Chapter, A. I. A. on subjects pertinent to architecture and building, he added this to his practical remarks concerning superintendence:

"In performing your work, whenever it is possible to do so, compliment the workman or contractor upon the work being done. We all like to hear nice things said about ourselves, and one who only finds fault and never anything to commend is much disliked. You will find that by kind words, when it is possible to give them, you will, in the long run, obtain much the better results."

THE Twenty-sixth Annual Exhibition of the Chicago Architectural Club will be held in the galleries of the Art Institute from May 6 to June 11, inclusive, and will contain works of architecture, sculpture, decoration, and interior furnishings.

THE Illinois Chapter of the American Institute of Architects has re-established a gold medal of honor for award to designers of buildings represented in the Annual Exhibition of the Chicago Architectural Club, the conditions accompanying the proposed award being as follows:

That any architectural work in the State of Illinois, if completed within five years previous to the date of exhibition, may be offered for consideration.

That the architect or architects who design the work, in order to be eligible to award must present for exhibition one or more photographs of the executed work, also one or more drawings, including a small scale plan, and shall submit to the jury such work in drawings of the structure as they may desire to examine. Any work represented in the exhibit may be eligible for consideration by the jury, provided that at least a plan and also a photograph of the executed work shall be brought before the jury on their request. Only architects or firms of architects maintaining offices in the State of Illinois will be eligible to the award.